The Influence of Beliefs on Children's and Adults' Cognition and Social Preferences

The influence of beliefs on children's and adults' cognition and social preferences

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Abstract

Beliefs—mental representations of particular propositions as true—are fundamental to social cognition. Among the most influential beliefs are ideologies, which concern the way things should be and help people understand the social structures within which they live.

Ideologies occupy a unique position because they contain elements of other types of beliefs. For example, to a Biblical literalist, the belief that the earth is 4000 years old may seem fact-like. Because not everyone agrees about ideologies, however, such beliefs may seem somewhat preference-like even to their strongest adherents.

To investigate the role of social experience in reasoning about ideologies, we examined children and adults. Because children have significantly less experience with ideologies, their reasoning may diverge from adults. On the other hand, if children and adults respond similarly, this would indicate that vast amounts of experience are not necessary for adult-like belief-based cognition to emerge.

Part 1 showed that 5-10 year old children and adults distinguished ideological beliefs from factual beliefs (a domain in which, if two people disagree, at least one must be wrong) and preference-based beliefs (a domain in which it is acceptable for people to disagree), indicating that much experience is unnecessary for this ability to emerge. Given that even young children recognize that those who disagree with their ideological beliefs are not necessarily wrong, it is possible that children would not show strong social preferences in this domain. On the other

hand, given children's propensity toward group-based preferences in other areas, even young children may show religion-based preferences. In Part II, 6-8 year old Christian children showed implicit pro-Christian preferences regardless of the comparison target's religion but only reported pro-Christian preferences when the two targets were very different from one another. In Part III, 6-11 year old children preferred peers who shared their religious, factual, and preference-based beliefs and selectively attributed pro-social behaviors to individuals who shared their religious views.

Taken together, these findings suggest that children and adults differentiate ideologies from other types of mental states and that, despite its complexity, ideology influences social judgments even among young children.

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Introduction

Beliefs are fundamental to social cognition. They represent information about ourselves and other people, help people imagine and predict what social relations are possible and desirable, and move individuals and groups to take actions within the social universe they inhabit.

Philosophers as well as psychologists have pondered beliefs for decades. Though some philosophers have argued that beliefs do not exist at all (Churchland, 1981; Stich, 1983), many scholars have arrived at nuanced definitions of this seemingly straightforward term. Among the most commonly agreed-upon definitions characterizes beliefs as mental representations about the truth of particular propositions (James, 1890; McDougall, 1921; Schwitzgebel, 2011). Under this definition, it does not matter whether the belief reflects an accurate or inaccurate representation of the world; what matters is that the person holding the belief perceives it as true. For example, the statements "the sky is blue" and "the sky is green" could both qualify as beliefs if the speaker of the second statement actually believes the sky to be green. Beliefs can also concern phenomena whose truth cannot be empirically established. For example, the statement "God created the universe" qualifies as a belief because a person can represent this statement as true regardless of the fact that its truth cannot be proven or disproven via scientific means.

Beliefs are useful for many things, and one of their functions is to influence behavior. Though the link between beliefs and behaviors has been tenuous in psychological research (Ajzen & Fishbein, 1977; LaPiere, 1934; Wicker, 1969), some contexts and measures are particularly likely to elicit behaviors that are consistent with a person's attitudes or beliefs. For example, attitudes toward specific behaviors (e.g., writing a dissertation) are better predictors of

those behaviors than more general beliefs (e.g., beliefs about education in general; Fazio, 1986), and forming a concrete intention to carry out a particular behavior also increases the correlation between attitudes and behaviors (see Ajzen & Fishbein, 2005, for a review).[1] Additionally, laypeople often assume that beliefs can predict behaviors. What could make more sense than the proposition that John will avoid germs if he believes they will make him sick, or the proposition that Helen will attend church regularly if she believes that is the only way to avoid eternal damnation?

Thus, in addition to influencing people's behaviors in some circumstances, beliefs also help individuals make sense of others' behaviors (Dennett, 1978, 1987, 1991). In particular, beliefs can make sense of behavior patterns that, in isolation, may not appear to link in a coherent way. Sarah's propensity to light candles every Friday night, avoidance of pork, and use of separate dishes for meat and milk products may not appear linked until we know that Sarah is an Orthodox Jew who believes that God has commanded these particular rituals. To an outside observer, knowing Sarah's belief about God explains her varied behaviors. Thus, representing others' beliefs can help individuals make sense of their social world. It may be the case that some beliefs—especially religious beliefs—are particularly likely to be associated with specific behaviors. This point is addressed in Part III.

As Trueblood (1939) pointed out, beliefs vary along a number of dimensions, and not all of these differences concern belief-behavior relationships. For example, some beliefs may be conscious while others are unconscious (see also Gendler, 2008); some may be about the past while others are about the present or the future; some may elicit more emotion than others, and

[1] This literature typically refers to attitudes, not to beliefs *per se*. For example, Fazio's (1986) MODE model attempts to explain relationships between attitudes and behaviors. Such models are also useful in understanding belief-behavior relationships because both attitudes and beliefs are a form of mental representation. That is, this literature demonstrates conditions under which internal mental states (attitudes or beliefs) can affect external behaviors.

so on. A particular aspect of difference that the current work emphasizes is the extent to which particular beliefs are represented as statements with only one correct viewpoint or statements concerning which multiple viewpoints are acceptable. This difference is particularly important in diverse societies, where people may often disagree about particular beliefs. Knowing the extent to which individuals perceive diverse beliefs, such as ideological beliefs, to have only one correct answer can help us understand how individuals represent others' beliefs in contexts where such beliefs are likely to differ from their own.

To understand the ways in which people reason about beliefs, studying adults is insufficient. By the time they have reached adulthood, people have already formed numerous beliefs, have interacted with hundreds of individuals who don't agree with those views, and have acted on the basis of their beliefs. However, the development of reasoning about complex beliefs such as ideologies remains unclear. Therefore, the current work addresses two main questions. First, how do children and adults reason about beliefs—especially ideological beliefs? Second, how do individuals respond to those who do not share their own beliefs? Part I of this dissertation addresses the former question, while Parts II and III are centered around the latter.

Three Types of Beliefs: Fact, Preference, and Ideology

To examine the influence of ideological beliefs on social cognition and intergroup attitudes, the current research compared ideologies with two other types of mental states: factual and preference-based beliefs.

Factual beliefs. A fact is "a state of affairs that is the case" (Wetzel, 2008). Thus, a factual belief is a mental representation of a part of the world seen as objectively true, regardless of variations in perspective and preference. For example, it is a fact that dinosaurs are extinct regardless of one's own preferences or desires to see a living dinosaur in the flesh. Factual

beliefs may be relative (e.g., “germs are very small”) or absolute (e.g., “George Washington was the first president of the United States”), and correct (e.g., “humans have only one brain, and it is in their head”) as well as incorrect (e.g., “humans have two brains, and there is one in each foot”). The current work examines each of these types of factual beliefs.

Preference-based beliefs. In contrast to factual beliefs, preference-based beliefs are not objectively true or false. Rather, they concern an individual’s evaluations of particular aspects of the universe (Eagly & Chaiken, 1993). Historically, social psychologists have viewed preferences as evaluative attitudes coupled with beliefs (Fishbein & Ajzen, 1972; Thurstone, 1928b; Trueblood, 1939). For example, Fishbein and Ajzen (1972, p. 488) wrote that “[a] person learns of forms beliefs about an object. These beliefs influence his attitude toward the object […] attitude is viewed as a compound in which the elements are beliefs and the affective value of the compound (i.e. attitude) is some function of the affective value of the constituent beliefs.” The current work incorporates this perspective by focusing on the beliefs associated with particular positively- or negatively-valenced evaluations. For example, the statement “bananagrams is the most fun game” is considered a preference-based belief because it incorporates a cognitive appraisal as well as an evaluative attitude. Social contexts often include more diversity of preference-based beliefs rather than factual beliefs; for example, while the belief that dinosaurs are extinct is nearly universal, the belief that bananagrams is the most fun game is more limited.

Ideological beliefs. Scholars have tended to define the term “ideology” relatively broadly. According to Marx and Engels (1845/1998), for example, ideology refers to the “production of ideas” (p. 42) and consists of everything that people verbalize as well as their un-articulated thoughts. In addition to religious and political views, this conception of ideology encompasses concepts such as ethics, art, and the legal system. In the view of Marx and Engels

(1845/1998), such ideologies are rarely benign; rather, they typically serve to legitimize and re-enforce existing power structures within a society. Even subordinate group members tend to frame their ideologies in terms of beliefs held by dominant-group members (e.g., as supporting or opposing particular ideological leanings in the interests of dominant group members, and not typically as creating entirely separate ideologies; Bonilla-Silva, 2006). Additionally, subordinate group members may justify dominant ideologies, even if such ideologies do not materially benefit their group (Jost & Banaji, 1994; Jost, Banaji, & Nosek, 2004; Sidanius & Pratto, 1999).

Modern scholars have offered definitions in line with the notion of ideologies as widely shared conceptions of social realities. For example, Jost (2006; Jost, Federico, & Napier, 2009) used the term to refer to shared beliefs about the social world. Ideologies serve both a descriptive and proscriptive role, communicating both what is and what should be (Jost et al., 2009). Similarly, Bulbulia and Sosis (2009) referred to ideologies as shared commitments and highlighted their importance to maintaining group cohesion, a conception of ideology with historical roots in research on "ideological groups" (Schweitzer, 1944). For example, subscribing to particular political ideologies may embed individuals in social groups that meet relational needs and help give life meaning.

Despite ideologies' roles in maintaining unequal power structures, they need not be violent. Indeed, the most effective ideologies may be paternalistic, framing subordination in terms of benevolent rather than hostile relationships (Glick & Fiske, 1996; Jackman, 1996). Such ideologies may be more resistant to change than ideologies grounded in conflict because both high- and low-power individuals involved in paternalistic situations may be motivated to avoid conflict. Situational variables (e.g., threat), as well as dispositional variables (e.g., conscientiousness) both influence individuals' ideological leanings (Jost, 2006). Ideological

beliefs are often an important part of who people are and map on to influential behaviors, such as voting (Conover & Feldman, 1981; Jost, 2006; Kerlinger, 1984), and long-lasting personality traits, such as openness to experience and curiosity (Carney, Jost, Gosling, & Potter, 2008).

Ideological beliefs are of theoretical interest because of the unique space they occupy with regard to other sorts of beliefs. On the one hand, like other beliefs, ideologies are mental representations concerning the truth of particular propositions. That is, they reflect a person's subjective sense of how the world is or should be, rather than necessarily reflecting objective reality. On the other hand, adults tend to hold their ideological beliefs more fiercely than other sorts of beliefs. Ideologies tend to form a particularly central component of adults' identities (Bonilla-Silva, 2006; Jost, 2006; Ysseldyk, Matheson, & Anisman, 2010), and they promote a great deal of worldwide conflict. It is tragic, but unsurprising, when millions of lives are lost in conflicts concerning religious or political disagreements, ranging from historical wars such as the Crusades to more recent events such as the shooting of Sikh worshippers in Wisconsin. It would be much more surprising if adults killed one another over disagreements concerning beliefs whose truth could be verified objectively (e.g., disagreements about scientific fact) or beliefs that are acknowledged to legitimately vary across people (e.g., disagreements about idiosyncratic preferences). Religious ideologies, in particular, are prone to such conflicts.

The example of religious ideology. As noted above, the current work focuses on ideological beliefs because they contain elements of both fact and preference, a property clearly seen in religious beliefs. For example, different religions disagree about matters of faith, suggesting that religious beliefs reflect preferences. Because of the variety of religious beliefs espoused by different individuals, children and adults may conclude that such beliefs provide information about the preferences of a particular person and differentiate one person from

another. However, religious individuals often regard their beliefs in more absolute terms. For example, half of White, evangelical Protestants believe that theirs is the one true faith (Pew Research Center, 2008); state-sponsored terrorists justify their actions by claiming that their opponents' beliefs are wrong (Wardlaw, 2009), and 47% of individuals affiliated with an evangelical church believe that there is only one way to interpret the teachings of their religion (Pew Research Center, 2008). Thus, children and adults may reason that religious beliefs reveal objectively correct information about the world and are therefore akin to facts.

Religious identities are also particularly important to individuals worldwide (Atran, 2002; Boyer, 2001; Coles, 1991; Ysseldyk et al., 2010). Around the world, the majority of people are theists (Lynn, Harvey, & Nyborg, 2009), and religion influences numerous aspects of life, including health and longevity (McCullough, Friedman, Enders, & Martin, 2009), pro-social behavior (Norenzayan & Shariff, 2008; Preston, Ritter, & Hernandez, 2010), and intergroup prejudice (Batson, Floyd, Meyer, & Winner, 1999). Christian adults prefer other Christians (Rowatt, Franklin, & Cotton, 2005) and exhibit disgust in response to atheism and non-Christian religions (Ritter & Preston, 2011). Additionally, differences of religious belief propagate much worldwide conflict among adults (Atran, 2006; Goldschmidt & Davidson, 2006), and regular attendance at religious services predicts greater support for terrorist attacks (Ginges, Hansen, & Norenzayan, 2009). Thus, differences of religious belief appear to matter to many adults.

Religion's influence begins early in development. Five-year-old children—even those raised in secular homes—categorize individuals based on religious cues (Diesendruck & HaLevi, 2006), and children in elementary school apply theistic reasoning to explanations concerning the natural world (Kelemen, 2004) and the afterlife (Bering, Blasi, & Bjorklund, 2005). Children of

this age also appeal to religion to explain morality (Nucci & Turiel, 1993) and use religious ideas to help them understand themselves, their families, and other people (Coles, 1991).

It is clear that even young children can reason about religious beliefs to some extent. The extent to which children distinguish religious beliefs from other mental states, however, remains unclear. Additionally, little is known about the ways that children might use religion to form social preferences. Thus, the current work adopted a social cognitive developmental approach, testing both children and adults, to examine change or stability in belief-based cognition across development.

The Development of Reasoning about Beliefs

Beliefs are so crucial to social cognition that the ability to reason about them emerges early in life. Thirteen-month-old infants attribute beliefs to agents (Surian, Caldi, & Sperber, 2007), and preschoolers attribute different kinds of beliefs to different agents. For example, four-year-old children attribute more accurate beliefs to God than to human beings (Barrett, Richert, & Driesenga, 2001; Knight, Sousa, Barrett, & Atran, 2004), and five-year-old children report that perceptual access to particular aspects of the world constraints the factual beliefs of a person but not of God (Gimenez-Dasi, Guerrero, & Harris, 2005). Most previous research on the development of belief understanding focuses on false beliefs, with a few studies examining reasoning about other properties of beliefs.

False belief understanding. A great deal of work has examined the development of false belief understanding, or the knowledge that others may hold incorrect beliefs that differ from one's own factually correct perceptions. A classic study in this field demonstrated that four-year-old children easily pass a false belief task. In one example of such a task, children hear a story in which Maxi puts some chocolate in a cupboard and then leaves the room. While Maxi is gone,

his mother moves the chocolate to a different cupboard. Children are asked to indicate where Maxi will look for the chocolate once he returns. Four-year-old children typically respond that Maxi will look in the original cupboard (that is, the place where he left the chocolate), while children younger than four tend to say that Maxi will look in the new cupboard despite the fact that he has not seen his mother move the chocolate (Wimmer & Perner, 1983). This basic finding has been replicated numerous times (Atance, Bernstein, & Meltzoff, 2010; Baron-Cohen, Leslie, & Frith, 1985; Birch, 2005; Guajardo, Parker, & Turley-Ames, 2009; Wellman, Cross, & Watson, 2001) and indicates that children younger than four experience difficulty articulating others' beliefs when those beliefs differ from the child's own perceptions.

However, more recent work suggests that even 15-month-old infants may understand false beliefs. In one study (Onishi & Baillargeon, 2005), infants were familiarized to an actor reaching for a toy inside one of two boxes. After familiarization, infants viewed either a true belief induction trial (e.g., both the actor and the infant watched as the toy moved from one box to the other) or a false belief induction trial (e.g., only the infant, not the actor, had visual access to the toy as it switched locations). After the false belief induction, but not the true belief induction, infants looked longer at follow-up displays showing the actor reaching for the toy in the correct (new) location. These results suggest that 15-month-old infants expected the actor to act in accordance with her beliefs rather than the actual state of the world. This work dovetails with other research demonstrating that infants attribute mental states to agents and use these attributions to make inferences about the world (Buresh & Woodward, 2007; Gergely, Bekkering, & Kiraly, 2002; Hamlin, Hallinan, & Woodward, 2008; Southgate & Csibra, 2009; Surian et al., 2007; Woodward, 1999); thus, it is unlikely that Onishi and Baillargeon's (2005) result is due to low-level perceptual processes like expecting the actor to reach in the last place

she looked. Instead, it appears that infants can attribute false beliefs but that young children experience difficulty articulating this understanding.

Reasoning about other properties of beliefs. Though most work on the development of reasoning about beliefs has focused on the property of being true or false, some evidence demonstrates that children reason about other properties of beliefs as well. For example, 18-month-old (but not 14-month-old) children understand that others' beliefs are informative, reasoning that an actor's belief about which food is the tastiest influences her food choices and preferences (Repacholi & Gopnik, 1997). Additionally, first- and second-graders differentiate scientific beliefs from evidence in favor of those beliefs, demonstrating that children in elementary school do not require perceptual access to the correct answer in order to infer that some beliefs are inaccurate (Sodian, Zaitchik, & Carey, 1991). Furthermore, children distinguish factual beliefs from those reflecting personal preferences, though it is unclear whether this ability emerges in preschool (Flavell, Mumme, Green, & Flavell, 1992; Wainryb, Shaw, Langley, Cottam, & Lewis, 2004) or late elementary school (Banerjee et al., 2007). In summary, previous research suggests that the ability to reason about others' beliefs emerges in infancy and that young children distinguish different types of beliefs along a number of dimensions.

Unanswered questions. Previous studies address many important questions concerning the development of reasoning about beliefs, yet several important questions remain unanswered.

First, past work has typically focused on only two types of beliefs. Many studies, including most experiments conducted on false-belief understanding, concern factual domains where another person's belief is clearly right or wrong. For example, numerous studies (Baillargeon, Scott, & He, 2010; Buttelmann, Carpenter, & Tomasello, 2009; Onishi & Baillargeon, 2005; Southgate, Senju, & Csibra, 2007; Senju, Southgate, Snape, Leonard, &

Csibra, 2011; Surian et al., 2007; Wimmer & Perner, 1983) test children's understanding of beliefs concerning the location of particular physical objects—beliefs whose correctness is unambiguous (a specific ball is either in one particular box or it is not) and can be verified easily. Some studies, particularly those examining children's understanding of different types of beliefs, have also examined personal opinions, such as which flower is the prettiest (e.g., Banerjee et al., 2007; Flavell et al., 1992; Wainryb et al., 2004). However, other beliefs have typically not been tested. This oversight is surprising given that other types of beliefs, including those of a religious and political nature, are especially important to adults (Baray, Postmes, & Jetten, 2009; Cadge & Davidman, 2006; Haji, Lalonde, Durbin, & Naveh-Banjamin, 2011; Jost, 2006; Ysseldyk et al., 2010). Social psychological studies demonstrate that people over 18 care a great deal about these types of beliefs, but developmental psychology has not yet answered the question of how these adults learned to reason about the beliefs that are so important to them. To address this question, the current work examines the development of reasoning about ideological beliefs as well as those based on fact and personal preference.

Second, previous work has not examined adults' belief-based reasoning. Instead, studies on beliefs have typically focused on the outcomes of such reasoning. For example, previous work suggests that adults prefer those who share their religious identity (Rowatt et al., 2005), but this work does not demonstrate how adults reason about different types of beliefs. Adults prefer those who share their religious beliefs rather than those who hold opposing views, but it is not clear what adults think a religious belief is or how they perceive such beliefs to differ from other belief systems. To address this question, the current work examines adults' as well as children's reasoning about different beliefs.

Part I primarily addresses these two questions. An additional question—the role that beliefs play in the formation of social preferences—serves as the focal point in Parts II and III.

The Development of Social Preferences

Previous work with children. Starting in infancy, humans categorize human faces into different groups. For example, 3-4 month old infants look longer at same-race faces (Kelly et al., 2005, 2007) unless they have had significant exposure to other-race faces (Bar-Haim, Ziv, Lamy, & Hodes, 2006); they also look longer at faces that are of the same gender as their primary caregiver (Quinn, Kelly, Lee, Pascalis, & Slater, 2008).

These findings demonstrate that infants can categorize humans according to social group membership, a prerequisite for the formation of social preference. However, preferential looking times could indicate a number of underlying cognitive processes, including social preference, surprise, intrigue, or wariness. Therefore, in and of themselves, these data are insufficient to support the hypothesis that infants and young children prefer some people over others based on social identities.

Evidence for group-based social preference in young children comes from studies using methodologies based on social exchanges and social choices. For example, 10-month-old infants preferentially accept toys from speakers of their native language, and 5-year-old children report that they would prefer to befriend a peer who speaks their own language rather than another child who speaks a foreign language (Kinzler, Dupoux, & Spelke, 2007). Five-year-old children also report that they would prefer to befriend peers who speak with an accent that sounds native rather than one that sounds foreign, and this preference is stronger than five-year-old children's preference for same-race peers (Kinzler, Shutts, Dejesus, & Spelke, 2009).

In addition to explicit self-report measures such as asking participants whom they would rather befriend, research on older children's social preferences uses responses to speeded reaction-time tasks such as the Child Implicit Association Test (Baron & Banaji, 2006) and behaviors such as selecting friends and playmates. Findings from these research programs demonstrate that children prefer those who share their race (Aboud, 1988; Baron & Banaji, 2006; Kowalski & Lo, 2001) and gender (Fabes, Martin, & Hanish, 2003; Martin & Fabes, 2001; Moller & Serbin, 1996; Powlishta, Sen, Serbin, Poulin-Dubois, & Eichstedt, 2001). Children even prefer those who share their minimal group identification. For example, they prefer those who are assigned to wear the same color t-shirt as them (Dunham, Baron, & Carey, 2011), especially if a person in a position of authority, such as a teacher, makes functional use of group labels based on t-shirt color (e.g., making comments like, "The Reds should line up first, and then the Yellows," Bigler, Spears Brown, & Markell, 2001; Bigler, Jones, & Lobliner, 1997).

Previous work with adults. Adult-like preferences emerge early in development. By the time they are six years old, White children show implicit pro-White preferences of the same magnitude as those shown by White adults (Baron & Banaji, 2006). By the time they have reached approximately 9 years of age, children have already learned that expressing such preferences is not socially acceptable. Thus, around 9 or 10 years of age, children's self-reported preferences begin to decline (Baron & Banaji, 2006; FitzRoy & Rutland, 2010).

Like children, adults also show explicit preferences for in-group members in some domains. They willingly report biases against fat people (Crandall, 1994; Crandall & Biernat, 1990; Schwartz, Vartanian, Nosek, & Brownell, 2006), sexual minorities (Haslam, Rothschild, & Ernst, 2002; Herek, 2002), and Muslims (Park, Malachi, Sternin, & Tevet, 2009; Rowatt et al.,

2005). Additionally, adults report preferences for and allocate more resource to strangers assigned to share their minimal group (Pinter & Greenwald, 2011; Tajfel & Turner, 1986).

However, among adults, it is now common to see implicit group-based preferences in the face of self-reports to the contrary. Though self-reported prejudices and stereotypes began to fade as early as the 1950s (Gilbert, 1951), the basic finding of self-reported prejudice continued to emerge until the 1980s (Gaertner & Dovidio, 1986). Adults reported preferences and stereotypes based on groups including race, nationality, and socio-economic status (Garrison & Burch, 1933; Katz & Braly, 1933; Pavlak, 1973; Thurstone, 1928a; Triandis & Triandis, 1960), and these preferences predicted behaviors at the group level. For example, during the time period when White participants in psychological studies were reporting prejudice against racial minorities, non-Whites were excluded from "White" neighborhoods, attended schools that were more poorly funded than predominantly White schools, and grew up to receive smaller salary increases for additional years of education (Sidanius & Pratto, 1999; though see LaPiere, 1934, for an early example of attitude-behavior mismatching).

More recent research confirms that subordinate group members continue to face discrimination in housing, education, and the workforce (Lipsitz, 2006; Sidanius & Pratto, 1999). However, recent scholars have found far weaker evidence of explicitly stated intergroup preferences (Cunningham, Nezlek, & Banaji, 2004; Dovidio, Kawakami, Smoak, & Gaertner, 2008; Fiske, 2002; Nosek, 2007; Nosek et al., 2007). That is, recent research demonstrates harms to out-group members in the absence of explicit group-based preferences.

Some have taken this as a cause for optimism, arguing that the United States has entered a panacea of egalitarianism (Arkes & Tetlock, 2004). Others, however, have shown that adults continue to harbor group-based preferences even in the face of explicit reports to the contrary.

On implicit measures—those that use reaction times or other difficult-to-control responses to measure attitudes and beliefs—adults demonstrate robust preferences for individuals based on race, gender, age, and physical appearance (Nosek et al., 2007; Rudman & Goodwin, 2004). Such preferences predict voting behavior (Greenwald et al., 2009), economic discrimination and physical harm against stigmatized group members (Rudman & Ashmore, 2007), and hiring decisions (Rooth, 2009). In socially sensitive domains such as race, implicit measures predict behaviors better than do self-reports (Greenwald, Poehlman, Uhlmann, & Banaji, 2009). This mismatch may occur because adults are sensitive to social desirability and do not wish to report prejudiced attitudes or because adults lack the self-awareness to know and articulate their own preferences (Nosek, 2007).

Unanswered question. The study of children's intergroup preferences is not new (Frenkel-Brunswik, 1948; Meltzer, 1941; Mussen, 1950; Porterfield, 1937; Sherif, Harvey, White, Hood, & Sherif, 1954/1961). Nevertheless, an important question remains unaddressed. Namely, it is unclear how children learn group-based preferences in domains that are not perceptually salient. Adults show preferences based on invisible group memberships, such as political orientation and religious affiliation (McPherson, Smith-Lovin, & Cook, 2001; Nosek et al., 2007; Rowatt et al., 2005). However, previous work on children's intergroup preferences has largely examined domains that are perceptually salient; thus, the process by which adults come to prefer individuals based on group differences that cannot necessarily be detected with one's senses remains unclear. It is possible that preferences in perceptually obvious and more hidden domains follow a similar developmental trajectory. On the other hand, preferences based on qualities that individuals cannot easily perceive with their senses may develop differently. For example, because religious identities are easy to conceal in secular societies, it may be difficult

to discern whether an individual is an in-group or an out-group member in this domain. Developing this ability may take longer than distinguishing perceptually salient groups; thus, preferences based on invisible groups may appear later in life. The current work examined invisible, belief-based identities—particularly those based on religion—to address the question of whether preferences in these domains develop differently than preferences in domains that are more perceptually obvious.

Overview of Current Work

Part I addressed the following question: How do children and adults reason about ideological beliefs as compared with factual beliefs (which have only one correct answer) and preference-based beliefs (which do not)? In Experiment 1, 5-10 year old children and adults learned about pairs of characters that held conflicting beliefs in each domain. For example, participants were told that "this person thinks that there is only one God, and this [other] person thinks that there are many gods" (ideological trial), that "this person thinks that germs are very big, and this [other] person thinks that germs are very small" (factual trial), or that "this person thinks that blue is the prettiest color, and this [other] person thinks that green is the prettiest color" (preference-based trial). After each trial, participants were asked, "Can both of these people be right, or can only one be right?" Across age groups, participants were most likely to say that only one person could be right when responding to factual disagreements and least likely to provide this answer when responding to preference-based disagreements; religious disagreements fell between these two extremes. This effect was not driven by participants' prior familiarity with the specific exemplars representing each type of belief (Experiment 2). Rather, these results suggest that even young children are capable of distinguishing the category of

religious beliefs from both factual and preference-based beliefs and that some aspects of religious cognition remain stable across development.

Parts II and III investigated the formation of social preferences based on religious identities and beliefs. Given that children do not think that those whose religious views differ from their own must be wrong, it is possible that they would not demonstrate social preferences in this domain. This hypothesis is further bolstered by arguments that social groups must be perceptually salient in order to influence children's preferences (e.g., Bigler & Liben, 2007). However, children readily form social preferences in a number of domains important to adults, such as race (Aboud, 1988; Baron & Banaji, 2006; Kowalski & Lo, 2001), gender (Fabes et al., 2003; Martin & Fabes, 2001; Moller & Serbin, 1996; Powlishta et al., 2001), and language/accent (Kinzler et al., 2009; Kinzler & Dejesus, 2013). Thus, it is also possible that children's preferences would extend even to groups unmarked by perceptual cues.

Specifically, Part II examined children's and adults' religion-based preferences. Experiment 1 demonstrated that Christian adults showed implicit pro-Christian preferences but explicit neutrality when comparing Christian and Jewish characters. Four additional experiments demonstrated that, unlike adults, 6-8 year old children demonstrated implicit-explicit convergence when judging two characters portrayed as very different from one another. For example, after learning about a Christian and a Hindu character, children reported preferring the Christian character and also demonstrated implicit pro-Christian preferences. Children continued to demonstrate implicit pro-Christian preferences even when the two characters were portrayed as relatively similar; however, under these conditions, they no longer reported a preference for either character, leading to an implicit-explicit dissociation similar to that observed among adults. These findings suggest that the seeds of implicit religious bias may be sown early and that

children require a marked difference between individuals of different religions before reporting their preferences.

Part II included several pieces of information about each character, including their religious beliefs, behaviors, and labels, because these are important components of religion as it is experienced by many people in daily life. However, because each character description included a number of different pieces of information, it was not possible to determine whether one aspect of religious identity may have been particularly influential to children's preferences.

Thus, the purpose of Part III was to investigate the role that beliefs play in the formation of social preferences. Because Part I demonstrated that children distinguish religious beliefs from other mental states, Part III included religious beliefs as well as factual and preference-based beliefs to determine whether differences between these beliefs might influence children's attitudes.

In Experiment 1, 6-9 year old children reported their own religious, factual, and preference-based beliefs and then learned about pairs of characters. In each pair, one character shared the participant's belief while the other character held an opposing view. Children reported preferring characters who shared their beliefs in all domains but selectively attributed more positive rather than negative actions only to characters who shared their own religious beliefs. Experiments 2-3 demonstrated that children continued to attribute more positive rather than negative actions to characters who shared their religious beliefs even when the other character in each pair shared a behavior with the participant. These results suggest that even young children form preferences based on others' invisible beliefs and that there may be a particularly strong link in children's minds between religious beliefs and the propensity to perform morally positive actions.

Taken together, these findings suggest that other's beliefs and religious identities are important even to young children, that children and adults distinguish ideological beliefs from other types of mental states, and that even young children use others' ideological views to form social preferences. These studies expand our knowledge of social cognitive development, especially as it relates to the development of reasoning about others' beliefs and the formation of social preferences. Additionally, this work serves to integrate inquiry across a number of sub-disciplines, including social and developmental psychology as well as the psychology of religion.

Part I

The development of reasoning about beliefs: Fact, preference, and ideology

Larisa Heiphetz, Elizabeth S. Spelke, Paul L. Harris, and Mahzarin R. Banaji

Abstract

The beliefs people hold about the social and physical world are central to self-definition and social interaction. The current research analyzes reasoning about three kinds of beliefs: those that concern matters of *fact* (e.g., dinosaurs are extinct), *preference* (e.g., green is the prettiest color), and *ideology* (e.g., there is only one God). The domain of ideology is of unique interest because it is hypothesized to contain elements of both facts and preferences. If adults' distinct reasoning about ideological beliefs is the result of prolonged experience with the physical and social world, children and adults should reveal distinct patterns of differentiating kinds of beliefs, and this difference should be particularly pronounced with respect to ideological beliefs. On the other hand, if adults' reasoning about beliefs is a basic component of social cognition, children and adults should demonstrate similar belief representations and patterns of belief differentiation. Two experiments demonstrate that 5-10 year old children and adults similarly judged religious beliefs to be intermediate between factual beliefs (where two disagreeing people cannot both be right) and preferences (where they can). From the age of 5 years and continuing into adulthood, individuals distinguished ideological beliefs from other types of mental states and demonstrated limited tolerance for belief-based disagreements.

Beliefs are invisible yet potent drivers of behavior and decision-making. Religious beliefs appear particularly influential. In the 1960s, a Catholic president was a hotly debated issue; in 2008, a candidate had to explicitly disavow possible connections to Islam; and in 2012, another candidate's Mormon faith was often mentioned as a dimension in voters' decision-making.

To understand ideological beliefs such as these, we analyze two other kinds of beliefs—facts and preferences—that are commonly found in adult minds. Do adults view ideologies to be more fact-like, more preference-like, or mixtures of the two? The content of most beliefs is acquired through experience, but is the manner in which the mind treats beliefs so fundamental to social cognition that even young children are able to treat them the way adults do? If children and adults demonstrate similar responses even to structurally and socially complex beliefs, such as religious ideologies, such evidence would suggest that vast amounts of social learning are unnecessary for the ability to distinguish beliefs to emerge. On the other hand, if adults and children view these three kinds of beliefs to be distinct, the manner in which they differ could provide clues to the cognitive and social experiences needed for belief-based reasoning to develop.

The term "belief" has many meanings that vary across disciplines of inquiry. However, among the most common is the noncontroversial definition that a belief is a mental state in which a person regards particular propositions as true (Schwitzgebel, 2011). We enumerate three types of beliefs that vary in the degree to which the truth of the proposition is commonly understood to be based on *fact* or *preference*, with special interest in the category of ideology, which contains elements of both.

Factual beliefs. We use a standard definition of a fact, i.e., that "a fact is a state of affairs that is the case" (Wetzel, 2008). We extend this definition to the psychological notion of a fact

by asserting that a fact refers to knowledge that is assumed to be true is some objective sense, independent of ordinary variations in perspective and preference.

Preference-based beliefs. Historically, social psychologists have viewed preferences as evaluative attitudes coupled with beliefs. For example, Fishbein and Ajzen (1972, p. 488) wrote that "[a] person learns or forms beliefs about an object. These beliefs influence his attitude toward the object. . ." We incorporate this perspective by examining the beliefs associated with particular attitudes or preferences. For example, we treat the statement "green is the prettiest color" as a preference-based belief because it incorporates a cognitive appraisal. Unlike factual beliefs, preference-based beliefs are idiosyncratic, varying across individuals and contexts.

Ideology-based beliefs. Ideological beliefs contain elements of both fact and preference, a property clearly seen in religious beliefs. For example, different religions disagree about matters of faith, suggesting that religious beliefs reflect preferences. Because different individuals espouse different religious beliefs, individuals may conclude that such beliefs provide information about particular people's preferences and differentiate one person from another. However, religious individuals often regard their beliefs as absolute. For example, half of White, evangelical Protestants believe that theirs is the one true faith, and 47% of individuals affiliated with an evangelical church believe there is only one way to interpret Christian teachings (Pew Research Center, 2008). Thus, individuals may reason that religious beliefs, like facts, reveal objectively correct information about the world.

Religious identities are also particularly important to individuals worldwide (Atran, 2002; Boyer, 2001; Ysseldyk et al., 2010). Around the world, the majority of people are theists (Lynn, Harvey, & Nyborg, 2009), and religion influences numerous aspects of life, including health and

longevity (McCullough, Friedman, Enders, & Martin, 2009), pro-social behavior (Norenzayan & Shariff, 2008), and intergroup prejudice (Batson, Floyd, Meyer, & Winner, 1999).

Religion's influence begins early in development. Five-year-old children categorize individuals based on religious cues (Diesendruck & HaLevi, 2006), and children in elementary school apply theistic reasoning to explanations concerning the natural world (Kelemen, 2004) and the afterlife (Bering, Blasi, & Bjorklund, 2005). Children of this age also demonstrate group-based preferences based on religion (Heiphetz, Spelke, & Banaji, in press), appeal to religion to explain morality (Nucci & Turiel, 1993), and use religious ideas to help them understand themselves, their families, and other people (Coles, 1991). The current research investigates whether children, as well as adults, also differentiate religious beliefs from other types of mental states.

A Developmental Approach to Understanding Beliefs

If the human mind is built to differentiate between various beliefs—even without much socio-cultural input—the ability to do so may appear even in young children who do not have much experience understanding and reasoning about their own beliefs and those of others. However, because children have less experience with belief-based disagreements than adults, they may represent different types of beliefs as similar to one another. To distinguish between these alternatives, the present research examines children and adults.

Several potential outcomes may results. Children may be more absolutist than adults, reasoning that only one person can be right for any type of disagreement, perhaps due to children's lesser experience with multiple viewpoints. Alternatively, children may be more relativist than adults, perhaps because they have held their own beliefs for a shorter period of time and may therefore be more open to disagreement.

A third possibility is that children and adults respond similarly. Such a result would support the idea that fact, preference, and ideology are sufficiently distinct that even young children understand that difference in the same way as adults. If this pattern emerges, it would suggest that decades of experience with others' beliefs are not necessary to understand the subtle differences between types of beliefs. Rather, such judgments are formed early in life and remain stable despite increasing exposure to others' beliefs.

If only adults were queried, the extent to which their reasoning relies on extensive social experience would remain unclear. To address this issue, the current experiments tested both children and adults.

Children's Knowledge of Beliefs

Most previous work on children's belief-based reasoning falls within a theory of mind framework—an approach that examines children's ability to understand various mental states. For example, in a classic theory-of-mind paradigm (Wimmer & Perner, 1983), children learn about a boy who places chocolate in a room and leaves. While he is gone, his mother moves the chocolate. Children older than four typically respond that the boy will subsequently search for the chocolate where he falsely believes it to be located (i.e., in its original location). This basic finding has been replicated numerous times (Wellman, Cross, & Watson, 2001) and indicates that children older than four can understand the implications of others' beliefs even when those beliefs differ from the child's.

Children obtain factual knowledge in a number of ways. Much of children's early factual knowledge comes from others, and children use a number of cues to determine which statements to believe. For example, preschool-aged children accept new information more readily from informants who have previously made correct statements (Corriveau, Packard, & Harris, 2011;

Jaswal & Neely, 2006; Koenig, Clement, & Harris, 2004; Tenney, Small, Konrad, Jaswal, & Spellman, 2011) and accept factual information more readily from informants who speak with certainty (Jaswal & Malone, 2007; Tenney et al., 2011) and from informants perceived to have expertise (Koenig & Jaswal, 2011; VanderBorght & Jaswal, 2009). Children also learn by discovering facts themselves. For example, children in preschool can determine the truth value of a statement like "there are crayons on the table" if they can see the table (Kuhn, 2011), and older children explore the world in ways that combine play and scientific investigation (Bonawitz, van Schijndel, Friel, & Schulz, 2012).

Though children in preschool are able to recognize indeterminacy—a state of affairs in which more than one answer might be correct and the correct alternative is unknown—it is not until adolescence that most children begin to reason about science as a way of obtaining knowledge rather than as a series of determinate facts (Fay & Klahr, 1996; Kuhn, 2011; Kuhn & Pearsall, 2000). On the other hand, children perceive preferences as idiosyncratic early in development, realizing that others may not share their preferences (Flavell, Flavell, Green, & Moses, 1990).

Like adults, children are quite good at distinguishing between factual and preference-based beliefs. For example, children report that individuals are more likely to disagree about preferences than about factual beliefs and that preference-based disagreements are more acceptable. However, it is unclear whether this ability emerges before children enter elementary school (Flavell et al., 1990; Wainryb, Shaw, Langley, Cottam, & Lewis, 2004) or later during the elementary school years (Banerjee et al., 2007). Additionally, previous work has not examined children's reasoning about ideological beliefs.

Overview of Current Experiments

The current work compares the development of reasoning about factual, preference-based, and ideology-based beliefs. Because religious ideology contains elements of both fact and preference, this domain provides a particularly compelling case study in belief-based reasoning. To investigate the origins of adults' cognition, we tested participants from a wide age range. In two experiments, we asked whether individuals holding conflicting beliefs could both be right or if only one could be right and found that participants of all ages distinguished ideologies from both facts and preferences.

Experiment 1

Method

Participants. The sample included 107 children (M_{age} = 7;9, range = 5-10 years; 66 girls) and 59 adults (M_{age} = 27;2, range = 17-60 years; 41 women). Five-year-old children reliably distinguish their own mental states from others' (Wellman et al., 2001) and thus served as the youngest participants. We employed a relatively wide age range, including an adult comparison group, to investigate a broad range of potential developmental shifts or consistencies.

We recruited children through a departmental database and in a museum in the northeastern United States. The sample was 68% White. Children's religious affiliation was determined by parental responses to the question, "How would you identify the religious affiliation of your child?" on a demographic questionnaire completed during the experiment. The sample was 60% Christian, 8% Jewish, 2% Muslim, and 15% atheist or agnostic; 15% of the children were classified as members of some other, unlisted, religion. Adults were recruited through the psychology department's subject pool (including students and non-student community members) and received $5 or course credit. These participants self-identified their religion on a demographic questionnaire at the end of the experiment. This sample was 51%

White and 46% Christian, 5% Jewish, 5% Muslim, and 32% atheist or agnostic; 12% identified their religion as "other."

Procedure. Children named their favorite color, song, game, and fruit. During each subsequent trial, the experimenter displayed images of two White children matched in gender, approximate age, and attractiveness, as determined by adults' earlier ratings. The experimenter attributed a belief to each child and asked whether only one or both of the characters could be right. For example, during one trial, the experimenter pointed to one character and said, "This child thinks that germs are very big." She then pointed to the other character and said, "This child thinks that germs are very small." The experimenter then asked, "Can only one of these children be right, or can both be right?" To account for the possibility that participants may have disagreed with both characters, we asked whether only one or both characters *could be* right instead of asking whether only one or both characters *were* right. This phrasing allowed participants to reflect on whether it was possible for both statements to be correct even if the participant did not endorse either statement.

All items belonged to one of five categories: (1) matters of religious doctrine (both of the children were portrayed as theists who disagreed about particular matters of doctrine, e.g., how many gods there are), (2) matters of religious faith (only one child was portrayed as a theist; e.g., one believed that God hears verbal prayer and the other believed that only other people hear verbal prayer), (3) facts, (4) familiar preferences, and (5) unfamiliar preferences. Reasoning that participants may think differently about disagreements that are relatively more severe, we distinguished between narrower matters of doctrine (which include one important underlying agreement; namely, each character believes in God) and broader matters of faith, which incorporate a starker difference of perspective. Similarly, we included some preference trials

where items endorsed by both characters were familiar to participants and other trials where only one favorite object was familiar (Appendix A).

The procedure for adults was similar except for the following changes: 1) Adults completed the experiment via a self-paced computer task; 2) 29 adults viewed pictures of child faces (i.e., the same stimuli viewed by children) while 30 viewed pictures of adult faces taken from Minear and Park (2004; like children, adults in this condition viewed pictures of peers). For both children and adults, we counterbalanced question order ("Can only one of these children be right, or can both be right?" vs. "Can both of these children be right, or can only one be right?"), item order, order of the photograph pairs, item/photograph pairing, and the side of the screen on which each photograph appeared.

Results and Discussion

The proportion of trials on which participants stated that only one character could be right (denoted as "one right" below) served as the dependent measure.

Primary analyses. Preliminary *t*-tests did not reveal a significant effect of participant religion, location of experiment, or age of target faces seen by adults; therefore, we subsequently collapsed across these variables. We conducted a 4 (belief type: doctrine vs. faith vs. fact vs. preference) X 4 (age: 5-6 year olds vs. 7-8 year olds vs. 9-10 year olds vs. adults) mixed-model ANOVA with repeated measures on the first factor. The analysis revealed a main effect of belief type: participants were most likely to respond "one right" when asked about factual beliefs and least likely to give this answer when reasoning about preference-based beliefs, with religious beliefs falling between these two extremes (F (2.78, 436.26) = 202.90, p<.001, partial η^2=.56).[2] Additionally, we observed a main effect of age: younger participants were more likely than older participants to provide the "one right" answer (F (3, 157) = 16.20, p < .001, partial η^2 = .24).

To examine age-related difference in children's reasoning, we conducted two planned simple contrasts using 9-10 year old children (N = 26) as the comparison group because we expected them to be most similar to adults. They differed significantly from 5-6 year old children (N = 44), $p < .001$, but not from 7-8 year old children (N = 37). When subsequently examining age differences across condition, we collapsed across the two older ages. Additionally, we conducted four linear regressions to examine the effect of adults' age on responses. In each analysis, we entered age (measured in years) as the predictor variable and one type of belief as the dependent variable. No regression reached significance.

The two main effects were qualified by a Belief Type X Age interaction (F (8.34, 436.26)[2] = 5.02, $p < .001$, partial $\eta^2 = .09$). To examine this interaction, we first asked whether each age group distinguished religious beliefs from both factual and preference-based beliefs. When averaging across faith and doctrine items, participants of all ages were more likely to respond "one right" when asked about factual rather than religious beliefs (5-6 year olds: M_{fact} = .92, SD_{fact} = .17; $M_{religion}$ = .72, $SD_{religion}$ = .27, F (1, 41) = 26.35, $p < .001$; 7-10 year olds: M_{fact} = .88, SD_{fact} = .19; $M_{religion}$ = .47, $SD_{religion}$ = .34, F (1, 62) = 95.96, $p < .001$; adults: M_{fact} = .80, SD_{fact} = .23; $M_{religion}$ = .34, $SD_{religion}$ = .31, F (1, 56) = 101.26, $p < .001$). Additionally, participants of all ages were more likely to respond "one right" when asked about religious beliefs rather than preferences (5-6 year olds: $M_{preference}$ = .44, $SD_{preference}$ = .39, F (1, 41) = 36.61, $p < .001$; 7-10 year olds: $M_{preference}$ = .10, $SD_{preference}$ = .25, F (1, 62) = 77.45, $p < .001$; adults: $M_{preference}$ = .10, $SD_{preference}$ = .24, F (1, 56) = 31.64, $p<.001$). All age groups situated religious beliefs between factual and preference-based beliefs.

[2] Due to a violation of sphericity, we report results using a Greenhouse-Geisser correction.

However, age influenced participants' perceptions of the two types of religious beliefs. Children's evaluations of faith-based and doctrinal disagreements did not differ (5-6 year olds: M_{faith} = .70, SD_{faith} = .32; $M_{doctrine}$ = .75, $SD_{doctrine}$ = .30, F (1, 41) = 2.18, *ns*; 7-10 year olds: M_{faith} = .48, SD_{faith} = .36; $M_{doctrine}$ = .46, $SD_{doctrine}$ = .38, F (1, 62)=.32, *ns*). However, adults were more likely to respond "both right" when judging matters of faith rather than doctrine (M_{faith} = .41, SD_{faith} = .40, $M_{doctrine}$ = .26, $SD_{doctrine}$ = .30, F (1, 57) = 13.60, p = .001).

Additionally, 5-6 year olds were more likely than 7-10 year olds to respond "one right" to doctrinal beliefs (F (1, 103) = 17.81, p < .001), faith-based beliefs (F (1, 105) = 10.87, p = .001), and preference-based beliefs (F (1, 104) = 32.07, p < .001), but not factual beliefs (F (1, 104) = 1.06, *ns*). 7-10 year olds were more likely than adults to respond "one right" to doctrinal beliefs (F (1, 119) = 10.17, p < .01). After controlling for multiple comparisons, older children did not differ from adults on any other dependent measure. All age groups situated religious beliefs between fact-based and preference-based beliefs, with the differentiation among these three categories being somewhat sharper among older participants (Figure 1.1).

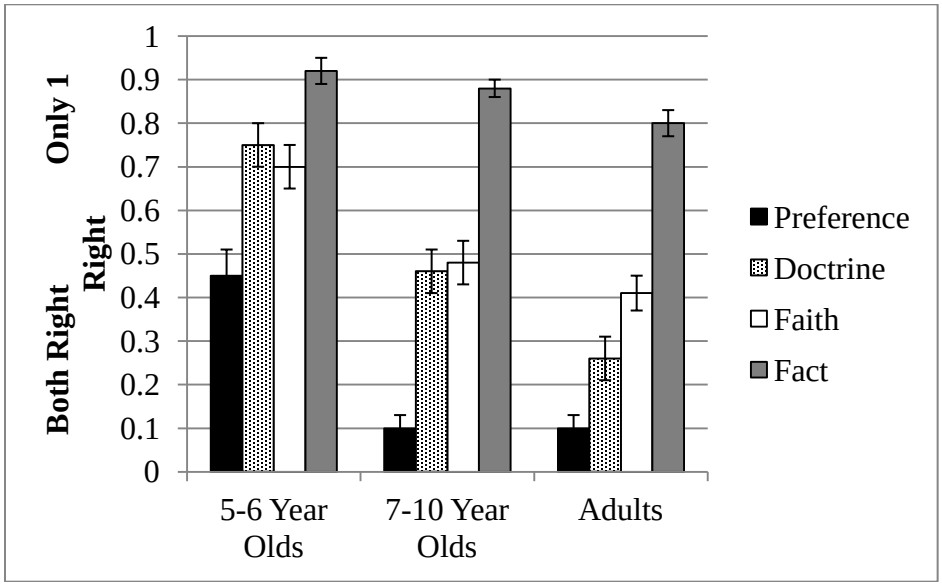

Figure 1.1. Proportion of trials during which participants responded that only one character could be right, Experiment 1. Error bars represent standard error of the mean.

We also used one-sample *t*-tests to compare the mean responses in each age group to chance (.50). Five- and six-year-old children were more likely than chance to respond "one right" to disagreements concerning doctrine (t (41) = 5.36, $p < .001$), faith (t (43) = 4.16, $p < .001$), and fact (t (42) = 16.13, $p < .001$); however, they responded at chance levels to disagreements concerning preference (t (42) = -.89, *ns*). 7-10 year old children responded "one right" more often than chance to factual disagreements (t (62) = 15.51, $p < .001$), less often than chance to preference-based disagreements (t (62) = -12.77, $p < .001$), and at chance to disagreements concerning doctrine (t (62) = -.92, *ns*) and faith (t (62) = -.52, *ns*). Like older children, adults responded "one right" more often than chance to factual disagreements (t (56) = 9.72, $p < .001$) and less often than chance to preference-based disagreements (t (56) = -12.37, $p < .001$). Additionally, adults were less likely than chance to respond "one right" to disagreements concerning doctrine (t (57) = -6.21, $p < .001$) and marginally less likely than chance to respond "one right" to disagreements concerning faith (t (58) = -1.79, $p = .078$). The fact that the youngest children's responses to the religion items differed reliably from chance suggests that children were not responding randomly to these items due to confusion. Older children's responses to religious items may not have differed from chance due to the transitional time period covered by these ages; 7-10 year old children may have been shifting from perceiving religious beliefs as matters with only one correct viewpoint to perceiving such beliefs as matters with more than one possible viewpoint.

Alternative interpretations. Beliefs concerning matters of faith and matters of doctrine may have emerged in mid-position between factual and preference-based beliefs because they truly occupy an intermediate position or because the sample consisted of two extreme groups

(i.e., some participants always responded “one right” whereas others always responded “both right”). However, few participants provided the same answer to all items within a belief category, showing that the data truly reflect participants’ conception of religion as situated between factual and preference-based beliefs (Table 1.1).

Table 1.1. Proportion of participants who provided consistent answers in Experiments 1 and 2 with standard deviation in square brackets and the proportion of all participants who consistently responded that only one character could be right in parentheses. We conducted a series of one-sample *t* tests using proportion of participants who provided consistent answers (regardless of whether they said that only one or both characters could be right) to determine whether each proportion was significantly different from 1.0 (indicating perfect consistency); * $p < .05$; ** $p = .001$; *** $p < .001$.

Belief Category				
Experiment 1				
	Preference	Doctrine	Faith	Fact
5-6 Year Olds	.44 [.50] (.16)***	.50 [.51] (.46)***	.45 [.50] (.39)***	.77 [.43] (.75)**
7-10 Year Olds	.84 [.37] (.03)**	.49 [.50] (.21)***	.43 [.50] (.18)***	.65 [.48] (.64)***
Adults	.74 [.44] (.17)***	.50 [.50] (.03)***	.59 [.50] (.20)***	.47 [.50] (.44)***
Experiment 2				
	Preference	Religion		Fact
5-6 Year Olds	.63 [.49] (.20)***	.38 [.49] (.29)***		.46 [.51] (.44)***
7-10 Year Olds	.75 [.44] (.07)***	.40 [.49] (.17)***		.49 [.50] (.42)***
Adults	.89 [.31] (.03)*	.51 [.51] (.19)***		.41 [.50] (.33)***

Another question concerns the nature of the items used. It is possible that half the religion items always produced a "one right" answer whereas the other half always produced a "both right" answer. Again, deeper analysis of the data by item revealed that this was not the case. Proportions of "one right" responses varied from .33 to .59 across all religion items, demonstrating that these items did not induce polarization. Similarly, neither the factual items (*M*s from .75 to .95) nor the preference-based items (*M*s from .14 to .25) produced polarization. Thus, the intermediate position of religious beliefs is not due to half of the participants responding "one right" to all beliefs in a particular category whereas the other half always responded "both right," nor is it due to participants unanimously responding "one right" to half of the beliefs in a particular category while responding "both right" to the other half. Rather, the intermediate position of beliefs concerning faith and beliefs concerning doctrine appears to reflect a truly unique mode of reasoning about the category of religion.

Experiment 2

Because Experiment 1 is the first to demonstrate that even young children differentiate religious beliefs from factual and preference-based beliefs, we conducted Experiment 2 to determine whether the effects would replicate and to explore a potential boundary condition. Participants may have used their confidence in their own pertinent beliefs, coupled with their past experiences of variability in beliefs expressed across people, to inform their responses. For example, being confident that germs are not very big, children may have readily judged that only one child could be right when the disagreement concerned the size of germs. If this process accounted for Experiment 1's results, it would be impossible to know whether children make qualitative distinctions between different categories of beliefs or whether children can only

distinguish between specific beliefs with which they are familiar. The latter possibility would imply that young children have not yet developed a representation of ideological beliefs as distinct from factual and preference-based beliefs. To address this alternative hypothesis, Experiment 2 removed relevant background knowledge.

Method

Participants. The sample included 100 children (M_{age} = 7;7, range = 5-10 years; 50 girls) and 37 adults (M_{age} = 26;8, range = 17-65 years; 24 women). Children were recruited as in Experiment 1. The child sample was 86% White and 57% Christian, 18% Jewish, 16% atheist or agnostic, and 9% members of some other, unlisted, religion. Adults were recruited through the psychology department's subject pool and completed the experiment online; they received course credit or the opportunity to win a $25 gift certificate. This sample was 60% White and, on a demographic questionnaire completed at the end of the study, participants self-identified as Christian (54%), Jewish (3%), Muslim (11%) atheist or agnostic (24%), or "other" (8%).

Procedure. The experimental procedure for children was similar to Experiment 1 with one notable exception: We altered the stimuli to eliminate any relevant background knowledge participants might possess. We asked participants to respond to others' religious, factual, and preference-based beliefs concerning a fictional planet, Tamsena. Experiment 2 stimuli did not distinguish between beliefs concerning matters of doctrine and faith because this distinction would be difficult to create for novel religious beliefs. Preference-based items included vocabulary unfamiliar to most participants to eliminate any potential effects of participants' own preferences (Appendix B). Because no differences were observed between adults viewing adult or child faces in Experiment 1, all adults in Experiment 2 viewed child faces.

Results and Discussion

Replicating Experiment 1, preliminary analyses did not reveal significant effects of test location or participant religion; thus, these variables were dropped from subsequent analyses. We conducted a 3 (belief type: religion vs. fact vs. preference) X 4 (age: 5-6 year olds vs. 7-8 year olds vs. 9-10 year olds vs. adults) mixed-model ANOVA with repeated measures on the first factor. The analysis revealed two main effects (Figure 1.2).

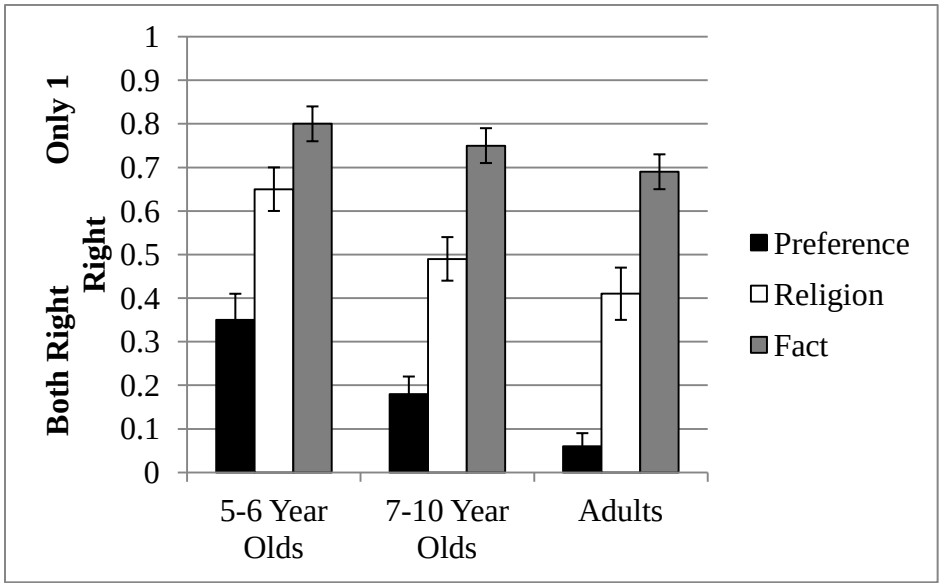

Figure 1.2. Proportion of trials during which participants responded that only one character could be right, Experiment 2. Error bars represent standard error of the mean.

First, participants were most likely to respond "one right" when asked about factual beliefs and least likely to give this answer when reasoning about preference-based beliefs, with religious beliefs falling between these two extremes (F (1.88, 243.00) = 142.78, $p < .001$, partial η^2=.53).[2] Second, younger participants were more likely than older participants to provide the "one right" answer (F (3, 129) = 5.91, $p = .001$, partial $\eta^2 = .12$). The Belief Type X Age interaction did not reach significance (F (5.65, 243.00) = 1.40, $p > .20$).[2] Across age groups, participants were more likely to say that only one character could be right when responding to disagreements about factual rather than religious beliefs ($M_{fact} = .75$, $SD_{fact} = .28$, $M_{religion} = .52$, $SD_{religion} = .36$, F (1, 133) = 65.79, $p < .001$) and when responding to disagreements about

religious rather than preference-based beliefs ($M_{preference}$ = .20, $SD_{preference}$ = .33, F (1, 133) = 79.17, p < .001).

As in Experiment 1, three linear regressions did not demonstrate a significant effect of adults' age on responses to disagreements. Additionally, two planned simple contrasts conducted on the children's data showed that 9-10 year olds (N = 25) differed significantly from 5-6 year olds (N = 41), p<.01 but not from 7-8 year olds (N = 34). Although the Belief Type X Age interaction did not reach significance, we conducted post-hoc pairwise comparisons to determine whether children demonstrated the same developmental milestones as in Experiment 1. Older children were more likely than younger children to say that both characters could be right in response to religious disagreements (M_{older} = .49, SD_{older} = .36, $M_{younger}$ = .66, $SD_{younger}$ = .32, F (1, 95) = 5.22, p < .05) and preference-based disagreements (M_{older} = .18, SD_{older} = .31, $M_{younger}$ = .35, $SD_{younger}$ = .40, F (1, 95) = 5.33, p < .05). However, these effects were weaker than those observed in Experiment 1; after correcting for multiple comparisons, both dropped to non-significance. Additionally, 7-10 year old children did not respond differently than adults to any dependent measure. Again, participants provided inconsistent responses to religious items (Table 1.1); furthermore, participants did not respond in a polarized fashion to different items within any belief category (Ms ranging from .44 to .57 for religious beliefs, .67 to .85 for factual beliefs, and .18 to .23 for preference-based beliefs).

As in Experiment 1, we also compared the mean responses in each age group to chance (.50). Replicating Experiment 1, 5-6 year old children were more likely than chance to respond "one right" to disagreements concerning religion (t (38) = 3.03, p < .01) and fact (t (38) = 8.42, p < .001). Additionally, 5-6 year old children tended to respond that both characters could be right when the disagreement concerned preference; however, this result did not reach significance

after performing a Bonferroni correction (t (37) = -2.35, p = .024). As in Experiment 1, 7-10 year old children responded "one right" more often than chance to factual disagreements (t (58) = 6.78, p < .001) and less often than chance to preference-based disagreements (t (58) = -7.85, p < .001); 7-10 year old children's responses to religious disagreements did not differ from chance (t (57) = -.18, *ns*). Like older children, adults responded "one right" more often than chance to factual disagreements (t (36) = 3.73, p = .001), less often than chance to preference-based disagreements (t (36) = -13.08, p < .001), and at chance to religious disagreements (t (36) = -1.29, *ns*). Participants' greater propensity to respond at chance levels to fictional religious beliefs (Experiment 2) rather than familiar religious beliefs (Experiment 1) may reflect their uncertainty when faced with novel religious views concerning an unfamiliar planet. The relatively more reliable responses provided by the youngest children may reflect these participants' greater facility with imaginary worlds (i.e., the youngest children may spend more time thinking about fictional places).

Even when reasoning about previously unfamiliar beliefs, children and adults continued to differentiate religious beliefs from both factual and preference-based beliefs. These results show that the differentiation between different types of beliefs does not depend on prior familiarity with the beliefs in question.

General Discussion

Two experiments demonstrated that children and adults distinguished religious ideologies from factual and preference-based beliefs, even when participants were unfamiliar with the particular beliefs tested. Even the youngest participants responded reliably to religious disagreements, and children, like adults, judged religion to occupy an intermediate position between facts and preferences.

Previous findings show that young children can reason about factual beliefs (Wellman et al., 2001) and preferences (Banerjee et al., 2007; Flavell et al., 1990; Repacholi & Gopnik, 1997). The current research shows that children can differentiate between these types of beliefs even before reaching elementary school. Children as young as 5 years seem to represent other minds as capable of containing conflicting beliefs. Additionally, around the age of 7 years, children become more likely to say that two people whose preferences conflict can both be right. This developmental shift may reflect children's increasing experience with contradictory preferences as they begin elementary school and learn to navigate the conflicting preferences of their peers.

Additionally, the current work is the first to demonstrate that children as young as 5 years of age can systematically judge religious beliefs differently from both fact- and preference-based beliefs. Even 5-6-year-olds make this differentiation, and it continues into adulthood in the same form, suggesting that children and adults have similar conceptions of religious beliefs vis-à-vis other types of beliefs. The fact that adult-like representations of beliefs are present in children suggests that adults do not require many years of experience to arrive at their judgments of conflicting beliefs. Rather, adults' distinction of ideological beliefs from both factual and preference-based beliefs appears to be the outcome of an early developmental process, and the ability to differentiate a variety of beliefs appears to be an early-emerging component of social cognition.

Though the current research sheds light on the under-studied topics of religious cognition and the development of reasoning about beliefs, it is not without its limitations. First, the samples in the current research were predominantly White and Christian. Though we did not find consistent differences between Christians and non-Christians, or between theists and non-theists,

it is possible that increased representation of racial and religious minorities would highlight differences between groups. Second, it is possible that children and adults from particularly conservative or religiously homogenous cultures might respond differently to belief differences. In such societies, individuals may perceive religious and political beliefs to be more similar to facts. Indeed, future research could profitably examine the development of belief-based reasoning cross-culturally. Importantly, however, the current work suggests that children as young as 5 are cognitively capable of distinguishing religious beliefs from other types of mental states. This finding shows that children are developmentally capable of making this distinction, even if they do not do so in all cultures.

The current research opens many questions concerning individuals' trust in others' testimony. Previous work in this area has focused on children's trust in others' factual claims—a domain in which children as well as adults believe that only one person can be right. A fruitful line of research could examine responses to others' testimony concerning beliefs that are not necessarily perceived to have only one correct answer. The current research also has important implications for the formation of intergroup preferences. The current work demonstrates that some children are willing to accept that those who disagree with them do not necessarily need to be wrong; thus, their intergroup preferences in belief domains may not be as strong as their social preferences in other areas. Exploring the implications of children's representations of mental states for intergroup preferences remains a fruitful avenue for future research.

Part II

Patterns of implicit and explicit attitudes in children and adults: Tests in the domain of religion

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Abstract

Among the most replicated results in social cognition is the split between explicit and implicit attitudes; adults demonstrate weaker group-based preferences on explicit rather than implicit measures. However, the developmental origins of this pattern remain unclear. If implicit attitudes develop over a protracted period of time, children should not demonstrate the implicit preferences observed among adults. Additionally, unlike adults, children may report group-based preferences due to their lesser concern with social desirability. In Study 1, Christian adults showed the expected pattern of robust implicit preference but no explicit preference. In four additional experiments, 6-8 year old children whose parents identified them as Christian viewed characters described as belonging to two starkly different religious groups ("strong religious difference") or two relatively similar religious groups ("weak religious difference"). Participants then completed explicit and implicit (IAT) measures of attitude toward Christians and either Hindus (Study 2) or Jews (Studies 3-5). Three main results emerged. First, like adults, children showed significant implicit pro-Christian preferences across all studies. Second, unlike adults, children in the "strong religious difference" case reported preferences of approximately the same magnitude as their implicit attitudes (i.e., no dissociation). Third, even in the "weak religious difference" case, children showed implicit pro-Christian preferences (although, like adults, their explicit attitudes were not sensitive to intergroup difference). These data suggest that the seeds of implicit religious preferences are sown early and that children's explicit preferences are influenced by the social distance between groups.

After decades of psychological research on intergroup relations, the knowledge that social categories influence attitudes and beliefs comes as no surprise. Starting in infancy (Kelly et al., 2005; Quinn, Yahr, Kuhn, Slater, & Pascalis, 2002) and continuing into the elementary school years (Aboud, 1988; Baron & Banaji, 2006), group memberships such as race, gender, and age influence perceptions of others (Allport, 1954; Fiske & Taylor, 1991).

As strong as the evidence is that social categories matter, it is equally well documented that that explicit endorsements of group stereotype and expressions of negative attitudes toward out-group members have diminished (Devine & Elliot, 1995; Madon et al., 2001). Some have taken this as a cause for optimism, arguing that individuals have become increasingly egalitarian (Arkes & Tetlock, 2004). Others argue that such changes, while genuine, are restricted to expressions of conscious cognition (Banaji, Nosek, & Greenwald, 2004). In fact, on implicit measures of social group attitudes and beliefs—those that use reaction times or other difficult-to-control responses to measure attitudes and beliefs—adults demonstrate robust intergroup preferences based on race, gender, age, and physical appearance (Nosek et al., 2007; Rudman & Goodwin, 2004). Such preferences predict voting behavior (Greenwald, Smith, Sriram, Bar-Anan, & Nosek, 2009), economic discrimination and physical harm against stigmatized group members (Rudman & Ashmore, 2007), and hiring decisions (Rooth, 2009). In fact, in socially sensitive domains such as race, implicit measures predict behaviors such as social distancing and non-verbal indicators of discomfort beyond the variance accounted for by self-reports (Greenwald, Poehlman, Uhlmann, & Banaji, 2009).

These differences in consciously expressed explicit attitudes and less consciously accessed implicit attitudes have produced a signature result in a wide variety of tests of social intergroup cognition: implicit and explicit attitudes are dissociated such that expressions on

explicit measures favor the in-group or dominant group to a relatively small degree, whereas implicit attitudes demonstrate robust preferences (Nosek et al., 2007). This dissociation has been observed so often that indeed we might say that "the dissociated state" characterizes the intergroup attitude profile of our generation (Brauer, Wasel, & Niedenthal, 2000; Devine, 1989; Fazio, Jackson, Dunton, & Williams, 1995; Fazio & Olson, 2003; Greenwald & Banaji, 1995; Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005).[3]

How Does the Dissociated State of Attitudes Develop?

Building on prior work conducted with adults, we investigated implicit and explicit attitudes among children. This approach allowed us to answer two important questions. First, to what extent do children's implicit and explicit attitudes resemble those of adults, particularly in a domain not marked by perceptual difference? Second, what factors might attenuate self-reported preferences in their earliest state?

To answer these questions, we utilized children's propensity to report group-based attitudes even in the presence of societal norms censuring expressions of intergroup bias. Adults' lack of explicit preferences may partially derive from their desire to appear egalitarian; however, children younger than approximately 9 years of age typically do not show evidence of spontaneous socially desirable responding in intergroup domains. Younger children report

[3] Several explanations have been offered to account for dissociations in attitudes. Some researchers (e.g., Devine, 1989; Strack & Deutsch, 2004; Wilson, Lindsey, & Schooler, 2000; see Chaiken & Trope, 1999) have put forth dual-process models, proposing that implicit and explicit attitudes result from multiple processes. Hofmann and colleagues (2005) propose several additional explanations for implicit-explicit dissociations, including the following: 1) Adults may knowingly conceal their attitudes on self-report measures due to social desirability concerns; 2) Adults may be unaware of their own attitudes; 3) Implicit and explicit measures may be conceptually mismatched; 4) Implicit and explicit attitudes may represent independent constructs; 5) The measures used may be unreliable. Several of these explanations are addressed in the methods of the current research. For example, the present research uses implicit measures previously shown to be reliable (see Nosek, Greenwald, & Banaji, 2007, for a review) and adapts explicit measures that have reliably distinguished between preferred and subordinate groups in past work (e.g., Baron & Banaji, 2006; Kinzler, Shutts, Dejesus, & Spelke, 2009). Additionally, the current work includes relative explicit measures and incorporate affective (e.g., friendship choice/liking) as well as cognitive (e.g., behavioral ascription) variables, making a conceptual mismatch account unlikely for these data. Because we do not seek to establish the cause of implicit-explicit dissociations, potential causes will not be discussed further.

preferring those who share their race (Baron & Banaji, 2006), language/accent (Kinzler, Shutts, Dejesus, & Spelke, 2009), and minimal group designation (Dunham, Baron, & Carey, 2011)—preferences that may be based on a number of factors, including group identity, social-conventional norms, and moral judgments (Rutland, Killen, & Abrams, 2010). Because these studies did not measure children's awareness of or desire to comply with social norms, it is not possible to say that young children never demonstrate susceptibility to social desirability. In fact, children as young as six may be aware of social desirability norms and respond in socially desirable ways under some circumstances (e.g., when accountable to teachers and classmates; FitzRoy & Rutland, 2010; Rutland, Cameron, Milne, & McGeorge, 2005). Additionally, even preschool-aged children conceal opinions that may be perceived as socially undesirable, such as negative evaluations of someone's drawing or a gift that one has received (Fu & Lee, 2007; Talwar, Murphy, & Lee, 2007). However, there is a lack of evidence demonstrating that children younger than 9 spontaneously respond in socially desirable ways in intergroup domains; in fact, in situations similar to the one created in the current experiments (e.g., no experimenter-imposed motivations to respond in an egalitarian fashion), children reported social preferences based on a variety of groups.

Children's tendency to report their intergroup preferences regardless of societal norms allowed us to test a factor that may attenuate self-reported bias. Specifically, we examined whether children's preferences depend on the strength of group differences. Because adults' self-reported preferences tend to be quite low, it is difficult to determine what factors might reduce adults' conscious preferences. However, a developmental approach allows us to determine whether emphasizing similarity between groups might attenuate such preferences. We drew on the Common In-Group Identity Model (Gaertner & Dovidio, 2000), which proposes that one way

to reduce bias is to highlight group similarities. For example, heterosexual students may exhibit less prejudice against gay students at their university if they re-categorize them as in-group members (students at the same university) rather than out-group members. We tested whether a more subtle manipulation—simply highlighting similarities between groups rather than encouraging participants to re-categorize individuals—might also attenuate preferences.

The Importance of Religious Differences

Examining preferences in the domain of religion provides several advantages to testing children in domains that have been extensively studied in prior research. First, religion offers a number of out-groups that vary in the degree to which they differ from one's own. For Christians, the Judeo-Christian tradition provides a close cousin in Judaism, another monotheistic religion with shared origins ("weak religious difference") compared to Hinduism, a polytheistic religion with strikingly different beliefs, rituals, and sacred texts ("strong religious difference").

Second, others' religious identities are not necessarily obvious. While some group memberships are perceptually salient (e.g., gender, race, age), in secular societies religious differences are more hidden. Because it can require more effort to determine who is a religious out-group member (e.g., one must rely on cues that may be less apparent than skin color or secondary sex characteristics), children have little direct knowledge of others' religious backgrounds. Some research shows that children do not routinely report group-based preferences unless members of the out-group are physically distinguishable and this perceptual dissimilarity is salient (Bigler, Jones, & Lobliner, 1997; Bigler, Spears Brown, & Markell, 2001). This finding highlights the importance of examining social preferences in a non-perceptual

domain to determine whether even young children can form preferences when out-group members are not physically distinguishable.

Third, religion is a particularly important, yet understudied, group membership. Most people in the world are theists (Lynn, Harvey, & Nyborg, 2009), and religious beliefs appear culturally universal (Atran, 2002; Boyer, 2001). Children as young as five categorize others on the basis of religious group membership (Diesendruck & haLevi, 2006), suggesting that even young children are sensitive to religious differences. Ten-year-old children apply religious concepts to explanations of morality (Nucci & Turiel, 1993), five-year-old children may be "intuitive theists" when reasoning about the origins of animate beings and inanimate objects (Kelemen, 2004), and starting at the age of six or earlier, children use religious teachings to help them understand the broader meaning of life (Coles, 1991). We asked if children would use religious identification as a basis for social preference.

Overview of Current Studies

In five experiments, we examined adults' (Study 1) and children's (Studies 2-5) preferences for members of groups demarcated by differences in religious beliefs and behaviors. The purpose of these studies was two-fold. We sought to examine the similarities and differences between children's and adults' implicit and explicit attitudes with a focus on the patterns of dissociation between the two. We also investigated the magnitude of religious differences to view whether the more automatic attitudes are visible even prior to the presence of explicit attitudes.

Study 1

Numerous prior experiments, both in the traditional laboratory and on the web, have established that adults report more egalitarian attitudes than those observed implicitly (Baron &

Banaji, 2006; Dovidio, Kawakami, Smoak, & Gaertner, 2008; Hofmann et al., 2005; Nosek, 2007; Nosek et al., 2007). We sought to replicate this finding 1) in the new domain of religion; 2) in a sample drawn from the same geographic population as child participants; and 3) using stimuli that could easily be adapted for use with children. These data will provide a baseline against which data from children in the next sequence of four studies can be compared.

Method

Participants. Participants were recruited through the Psychology Department Subject Pool and received either course credit or $5. They were 33 self-identified Christians (36% Protestant, 64% Catholic; 17 women) between the ages of 21 and 48 years (mean age = 32;8). The sample was 67% White, 18% African American, and 9% Hispanic; 9% selected "other" as their racial identification. Participants identified their religious affiliation, as well as other relevant demographic characteristics, on a questionnaire completed at the end of the study. Two questions measured religiosity. First, we asked participants to indicate how often they attended services at a place of worship. Response options were: "never" (coded as 0), "less than once a year," "once a year," "a few times a year," "once or twice a month," and "every week or more often" (coded as 5). On average, participants reported attending services "a few times a year" (M = 3.18, SD = 1.49). Second, participants responded to the question, "How important is your religious tradition to you?" Responses ranged from 1 ("not at all important") to 7 ("very important"), M = 4.73, SD = 1.77. Since participant religion was not known before the study, a small set of data were collected from non-Christian participants; these are presented briefly, together with data from non-Christian children, after the presentation of data from all studies.

Procedure. Adults were informed that they were completing a study similar to one run with children to reduce incredulity at the child-like stimuli. In Part 1, participants read one story

about a Jewish child and another story about a Christian child. We chose these religious groups because many Americans identify with the "Judeo-Christian" tradition, and this choice allowed us to begin our investigation with the two most reliably familiar religious groups. Stories were written at a first grade reading level to allow comparison with child participants and were matched in length; we also equated relevant aspects of the stories for familiarity. For example, we described one character as celebrating Easter and the other as celebrating Hanukkah because these are both well-known religious holidays that do not carry the secular connotations of Christmas or Passover (holidays that are often described as "family holidays" and therefore have strong cultural as well as religious associations). Characters were described as having traits that would be shared with most members of their religious in-group broadly construed; for example, the Christian character was not described in specifically Protestant or Catholic terms and was therefore expected to be similar to Christian participants.

Stories were accompanied by illustrations. All characters were portrayed as White because this is the modal racial identification in the location where these studies were conducted; however, both characters were matched in gender to the participant. Six pictures of children obtained from publicly accessible web sites represented the characters. Child pictures were used to equate adult stimuli with those shown to children; because children may feel uncomfortable indicating preferences between two adults, all characters were represented as children of approximately the same age as the child participants. Each adult was only exposed to two of the six pictures, and the pictures they saw (as well as the match between picture and religious affiliation) were counterbalanced across participants. In this and all subsequent studies, the pictures were counterbalanced such that the same image was portrayed as Christian to some participants and as non-Christian (in this case, Jewish) to others.

Stories were counterbalanced such that approximately half of the participants read the Jewish story first while the other half read the Christian story first (Appendix C). The first page introduced participants to the character and was not accompanied by a religious description. Each subsequent illustration was accompanied by a description of a practice; one of these illustrations was also accompanied by an explicit statement concerning belief. However, characters' religious affiliations were never labeled.

After reading both stories, participants answered face-valid questions concerning their preferences (e.g., which character was nicer). Additionally, adults answered questions adapted from Dunham and colleagues (2011). Specifically, adults read a series of verbal descriptions of the actions performed by unidentified characters. These actions represented both good (e.g., "helped their friends with schoolwork") and bad (e.g. "stole a toy from a neighbor") behaviors. Participants indicated which character they thought performed each behavior. We used such questions to determine whether any in-group preferences indicated positive in-group evaluations, negative out-group evaluations, or a combination of the two. As a neutral control, participants were also asked to select the character that they thought had a peanut butter and jelly sandwich for lunch. The order of these questions was randomized and counterbalanced across participants (Appendix D).

In Part 2, adults completed a computerized Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) in which they categorized words as quickly as possible. Some words were categorized along a valence dimension (i.e., participants pressed one key if they saw a positive word and a different key if they saw a negative word), while others were categorized along the dimension of religion (i.e., participants pressed one key if they saw a word related to Judaism and a different key if they saw a word related to Christianity). Of particular interest are

trials where participants used the same key to categorize words according to both valence and religious category. For example, in one block, participants pressed one key if they saw a good word (e.g., marvelous, superb) or a word related to Judaism (e.g., synagogue, rabbi) and a different key if they saw a bad word (e.g., tragic, horrible) or a word related to Christianity (e.g., church, priest). A separate block switched the pairing, such that participants used the same key to respond to good + Christianity and a different key to respond to bad + Judaism. Block order was counterbalanced across participants. A positive IAT score in this instance indicates faster reaction times when pairing good + Christianity / bad + Judaism; for brevity, we refer to such a result as a pro-Christian preference, though the results could also indicate an anti-Jewish bias.

The IAT differs from the explicit measure in several respects (e.g., it requires fast responses and categorization of images as Jewish or Christian). However, the two measures are commensurate in several important ways related to the question of interest. As with explicit items, IAT scores have been interpreted as indicators of preference (Baron & Banaji, 2006; Cvencek, Greenwald, & Meltzoff, 2011; Greenwald et al., 1998; Newheiser & Olson, 2012). Additionally, despite playing a role in preferences, familiarity alone cannot explain IAT effects (Dasgupta, McGhee, Greenwald, & Banaji, 2000; Ottaway, Hayden, & Oakes, 2001; Rudman, Greenwald, Mellott, & Schwartz, 1999).

Results and Discussion

We used a one-sample *t*-test to compare IAT scores (*D*s) to 0, a score that would indicate no difference in reaction times between the Jewish + good / Christian + bad and the Christian + good / Jewish + bad conditions. We followed the IAT data reduction protocol outlined by Greenwald, Nosek, and Banaji (2003); this resulted in the removal of one participant's score

from the final analyses. Participants exhibited a strong implicit pro-Christian preference (mean D = .43, SD = .45, t (31) = 5.43, $p < .001$).

To examine explicit preferences, we calculated the proportion of trials on which adults selected the Christian character when asked about direct social preference and the performance of good and bad behaviors. In each of these categories, adults responded at chance (social preference: M = .50, SD = .42, t (31) = 0, $p > .05$; good behavior: M = .41, SD = .34, t (32) = -1.53, $p > .05$; bad behavior: M = .61, SD = .41, t (32) = 1.49, $p > .05$). Adults also responded at chance levels to the control question ($N_{\text{Christian character}} = 21$; $N_{\text{Jewish character}} = 12$, binomial $p > .05$).

Christian adults did not report preferring either Jewish or Christian characters. However, they showed an implicit pro-Christian preference. These results are consistent with previous work documenting a discrepancy between adults' implicit and explicit attitudes in non-religion domains.

Study 2

Having established that Christian adults show implicit pro-Christian preferences in the absence of explicit animus, we sought to examine implicit and explicit religion-based preferences in children by investigating children's preferences for Christian v. Hindu characters. We replaced Judaism with Hinduism because adults may have noticed differences between the Christian and Jewish characters that may not be salient to children. For example, adults may have placed a great deal of emphasis on theological differences and therefore perceived the two characters as very different, whereas children, who have had less exposure to theology, may have placed more emphasis on similarities such as believing in one God and attending religious services.

Method

Participants. Participants were 24 children (10 girls) between the ages of 6 and 8 years (*M* = 7;8). During the study, parents completed a demographic questionnaire. They identified their children as Protestant (33%), Catholic (42%), or members of some other sect (25%).[4] On average, parents reported that their children attended services between "every week or more often" and "once or twice a month" (*M* = 4.50, *SD* = .72) and that it was quite important for them to raise their children in a religious tradition (*M* = 6.08, *SD* = 1.14). The sample was 58% White, 4% African American, 4% Asian American, and 8% Hispanic; 25% of the parents identified their child's race as "other." Participants were recruited through a departmental database and received a small toy in exchange for their participation; during recruitment, parents were informed that the study contained religious content. An identical recruitment procedure was followed for all subsequent studies.

Procedure. Children viewed a Power Point presentation in which two characters paired with religious objects appeared one at a time. All characters were White and gender-matched to the participant. The experimenter explained each religious symbol and then asked two questions. For example, on one trial, she pointed to the first child and said, "This boy is Hindu, and his favorite holiday is Diwali . . . Here is a picture of some Diwali lamps down here." The experimenter then pointed to the second child and said, "This boy is Christian, and his favorite holiday is Easter . . . Here is a picture of the Easter bunny down here" (Appendix E).

After reading both stories, the experimenter elicited participants' explicit preferences using several counterbalanced questions adapted from Dunham et al. (2011) and Kinzler et al. (2009). Like adults, children were asked to indicate their preference, to guess who had done good

[4] For brevity, such children will be referred to as "Christian children" subsequently. However, it is important to note that children's beliefs may differ from those of their parents.

and bad behaviors, and to answer a control question. Among adults, asking participants to infer behaviors is often used as an implicit measure (Wittenbrink & Schwarz, 2007). However, among children, such questions have been used to tap conscious processes (Dunham et al., 2011). Again, these items allowed us to determine whether social preferences were driven by positivity toward the Christian character or negativity toward the non-Christian character. Children were also asked to indicate which character they thought was American[5] and which was more like them. After completing these trials, participants completed a Child IAT (Baron & Banaji, 2006) by categorizing good and bad words and faces of the characters as quickly as possible.

To avoid experimenter bias, the experimenter was carefully trained on standard techniques used in developmental psychology to avoid influencing responses. For example, when asking children the explicit questions, the experimenter looked at the child rather than at the screen to ensure that gaze would not serve as a cue to the "correct" answer.

Results and Discussion

Similarly to adults, children exhibited an implicit pro-Christian preference (mean D = .21, SD = .33, t (23) = 3.08, $p < .01$). Additionally, they reported preferring the Christian character on nearly all items. Data were analyzed in the same way as Study 1. Participants selected the Christian character on the majority of direct preference trials (M = .75, SD = .39, t (23) = 3.14, $p < .01$) but ascribed fewer bad behaviors to the Christian character than would be expected by chance (M = .23, SD = .33, t (23) = -4.03, p = .001). Binomial tests revealed that Christian children also selected the Christian character when asked which character was

[5] Despite the fact that responses to the peanut butter and jelly question were not significantly different from chance in Study 1, the percent of participants selecting the Christian character was higher than we expected. It is possible that participants associated the Christian character with eating a peanut butter and jelly sandwich because peanut butter and jelly is a prototypically American food. Previous work has shown that participants associate Whites with American more than other racial groups, such as Asian Americans (Devos & Banaji, 2005). It is possible that religious groups that are more predominant in American society (e.g., Christians) may also be associated with American to a greater extent than minority religious groups. To test this hypothesis more directly, we included the question, "Which of these children do you think is an American?"

American (*N*s = 20 v. 4, $p < .01$), which character had a peanut butter and jelly sandwich for lunch (*Ns* = 19 v. 4, $p < .01$), and which character was more like them (*N*s = 21 v. 3, $p < .001$). The only items on which participants did not display a significant pro-Christian bias were those concerning good behaviors ($M = .63$, $SD = .37$, $t\ (23) = 1.66$, $p > .05$).

By the age of 6, Christian children, like adults, demonstrate implicit pro-Christian preferences. Unlike adults, children also reported pro-Christian preferences. Children's preferences could not have been driven by perceptual dissimilarities between the characters since both were represented with counterbalanced photographs of White children. Thus, in contrast to prior work (see Bigler & Liben, 2007), Study 2 also demonstrates that perceptual differences are not necessary in order for preferences to emerge.

Study 3

Three potential explanations may account for children's pro-Christian v. Hindu preferences. First, children may indiscriminately prefer their own or the culturally dominant religious group, regardless of any characteristics of the contrast character. (See general discussion for a more detailed account of preferences for one's in-group v. the culturally dominant group.) Second, children's responses may reflect preferences for a member of a familiar religious group. Third, their responses may reflect preferences for the character that is more similar to them.

Study 3 examined the latter two possibilities by presenting children with members of two familiar religious groups (Christianity and Judaism) while highlighting differences between the groups. American adults know more about Judaism than Hinduism; for example, 71% of Christian adults correctly identified Moses as the Biblical figure that led the exodus out of Egypt, a number comparable to the 74% of Christian adults who correctly identified the birthplace of

Jesus. This familiarity with Jewish sacred texts is likely driven by the large overlap between the Jewish and Christian scriptures, an overlap that is not found with Hinduism. Tellingly, only 33% of Christian adults correctly identified Vishnu and Shiva as Hindu deities (Pew Research Center, 2010). Given that adults can only teach children information that they themselves know, it is highly plausible that American children—particularly those from Christian families—learn more information about Judaism than Hinduism and that, therefore, aspects of both Christianity and Judaism are relatively familiar whereas aspects of Hinduism are less familiar.

Method

Participants. Participants were 35 children (17 girls) between the ages of 6 and 8 years (M = 7;5), all of whom were identified as Christian (20% Protestant, 60% Catholic, 20% some other sect) by their parents. On average, parents reported that their child attended services "once or twice a month" (M = 4.09, SD = 1.24) and that it was moderately important to raise their child in a religious tradition (M = 5.06, SD = 1.84). The sample was 74% White, 3% African American, 3% Asian American, and 3% Hispanic; 14% of the parents identified their child's race as "other."

Procedure. The procedure was similar to that used in Study 2; however, the stories concerned Christian and Jewish characters. The descriptions of the Christian character were nearly identical to those used in Study 2, with minor changes (e.g., whether the Christian character thought it was silly to believe that there are many gods [Study 2] or that another name for God is Elohim [Study 3]; see Appendix F). After answering the same explicit questions used in Study 2, participants completed a Christian/Jewish attitude IAT by categorizing the faces of the Christian and Jewish characters as well as good and bad words.

Results and Discussion

When analyzing IAT results, we removed data from two participants due to parental interference (1) and an unusually high number of errors (1; the cut-off for an "unusually high" was taken from the guidelines established by Greenwald, Nosek, and Banaji [2003]). One additional child did not wish to complete the IAT. Similarly to participants in Studies 1-2, the remaining participants exhibited a significant pro-Christian preference (mean D = .15, SD = .37, t (30) = 2.19, $p < .05$).

Explicit data were analyzed as in Studies 1-2. Participants were more likely than chance to ascribe positive behaviors to the Christian character (M = .68, SD = .33, t (32) = 3.20, $p < .01$) and less likely than chance to ascribe negative behaviors to the Christian character (M = .34, SD = .34, t (33) = -2.76, $p < .01$). Additionally, participants reported a nearly-significant pro-Christian preference (M = .64, SD = .40, t (32) = 1.96, p = .059). Binomial tests revealed that Christian children also selected the Christian character more often than would be expected by chance when asked which character was American (Ns = 27 v. 8, $p < .01$), which character had a peanut butter and jelly sandwich for lunch (Ns = 24 v. 11, $p < .05$), and which character was more like them (Ns = 30 v. 5, $p < .001$).

Even when judging between members of two familiar religious groups, children continued to show implicit and explicit pro-Christian preferences. Additionally, children's responses diverged from those of adults, who failed to report an explicit preference even in the face of implicit bias. Studies 4-5 investigated conditions under which children, like adults, may report weaker explicit preferences than those demonstrated implicitly.

To confirm our assumptions concerning children's perceptions of Christianity, Judaism, and Hinduism, we collected data from an independent sample of 20 children (M_{age} = 7;8). We described three characters using descriptions from Studies 2-3 and including information about

both beliefs and practices (i.e., the Christian character was described as celebrating Easter and believing in Jesus, the Jewish character was described as celebrating Hanukkah and believing in Elohim, and the Hindu character was described as celebrating Diwali and believing in many gods; none of the characters referred to another person's belief as silly). After reading the paragraph-long description of each character, the experimenter asked, "Which of these two people [pointing to the Jewish and Hindu characters] is most like this person [pointing to the Christian character]?" Fifteen of the children selected the Jewish character, and a binomial test indicated that this proportion was significantly above chance ($p < .05$). These data indicate that, as we predicted, children perceived the Christian and Jewish characters to be more similar to each other than the Christian and Hindu characters. These data may also be consistent with the idea that the beliefs and practices associated with the Jewish character in this study may have seemed more familiar to participants than those associated with the Hindu character; if children perceived the Hindu character to be more familiar, they likely would have responded that the Hindu and Christian characters were most similar to each other, given that the Christian character was described using well-known aspects of Christianity.

Study 4

To examine the boundary conditions of children's preferences, and to determine whether children may demonstrate the same pattern of results obtained among adults (greater implicit rather than explicit preferences) in some contexts, we first conducted a pilot test to establish conditions under which an explicit preference does not emerge. Children reported pro-Christian preferences when judging between two very different characters; however, adults failed to report a preference when judging between characters who may seem quite similar to children. If children's explicit preferences depend on a strong contrast between the two groups, such

preferences should be attenuated if two relatively similar characters are presented. On the other hand, if Christian children indiscriminately prefer Christians to members of all other religious groups, they should continue to report pro-Christian attitudes. Thus, in the pilot study, 30 children (15 girls; 30% Protestant, 53% Catholic, 17% some other sect; M_{age} = 6;3) heard the same stories read by adults in Study 1 and responded to the same behavioral questions. Questions of direct social preference, adapted from Kinzler et al. (2009), asked which character the child would rather befriend and which character the child would rather invite to a party. Participants responded at chance levels to all items (social preference: M = .57, SD = .41, t (29) = .89, p > .05; good behavior: M = .50, SD = .39, t (29) = 0, p > .05; bad behavior: M = .45, SD = .39, t (28) = .48, p > .05; control question: $N_{\text{Christian character}}$ = 18, $N_{\text{Jewish character}}$ = 12, p > .05)[6], demonstrating that when two characters were presented as relatively similar, children exhibited the same lack of explicit preference shown by adults.

[6] We also included a number of additional, exploratory questions in this pilot study. We asked children to a) respond to a set of 4 manipulation check questions at the end of the study, replicating the procedure from Study 1; b) label the religious affiliation of each character; and c) label their own religious affiliation.

Children demonstrated correct recall on 82% of memory trials, an accuracy rate significantly above chance (50%) as measured by a one-sample *t*-test, t (29) = 6.42, p < .001. To test their prior knowledge of religious differences, we calculated accuracy in identifying characters' religions by coding responses as correct (1) or incorrect (0) and computing the proportion of correct answers. A one-sample *t*-test using .50 as the comparison indicated that responses did not differ from chance (M = .48, SD = .44, t (29) = -.21, p > .05). However, a regression using participant's age in days at time of study as the predictor and accuracy as the dependent measure indicated that older children responded more accurately than did younger children (B = .001, SE = .00, Beta = .49, adjusted R^2 = .21, F (1, 29) = 8.73, p < .01). In fact, 6-7 year old children provided accurate labels more often than chance (M = .75, SD = .40, t (11) = 2.17, p = .05), indicating familiarity with religious labels. We conducted three additional regression analyses entering age in days as the predictor and an explicit-question category (direct social preference and ascriptions of good and bad behaviors) as the dependent measures. All analyses were non-significant, indicating that although age influences accuracy of religious labeling, it does not influence explicit preferences.

We computed accuracy in identifying one's own religion by comparing children's responses to the question, "What religion are you?" with adults' responses to, "How would you identify the religious affiliation of your child?" Responses were scored as a match when children and parents provided the same label (e.g., "Protestant") or when one label was a sub-set of the other (e.g., parents identified as Protestant and child identified as Christian). Though only 14 out of 30 Christian children self-identified as Christian, 10 out of 12 older children did so, indicating that the ability to accurately self-identify as a member of one's religious group increases between 6 and 7 years of age. Because age did not influence self-reported preferences, it appears that age-related religious developments (e.g., ability to self-identify as a member of a religious group) do not scale with religion-based preferences.

Given that children failed to report pro-Christian attitudes when deciding between two similar characters, it is possible that under these conditions, they would demonstrate the same implicit-explicit dissociation seen among adults. On the other hand, because the explicit system failed to differentiate two similar characters among children, it is possible that the implicit system would respond similarly. In this case, children should exhibit neither explicit nor implicit pro-Christian preferences when judging between two similar characters. Thus, the main goal of Studies 4-5 was to determine whether it is possible to attenuate explicit preferences among children too young to demonstrate spontaneous socially desirable responding. Because children's lack of reported pro-Christian preference stands in stark contrast to their explicit preferences in perceptually salient domains (Baron & Banaji, 2006; Bigler et al., 1997, 2001; Dunham et al., 2011; Fabes, Martin, & Hanish, 2003; Kinzler et al., 2009), a second goal of Studies 4-5 was to serve as a conceptual replication of the pilot study.

Method

Participants. Participants were 17 children (9 girls) between the ages of 6 and 8 years (*M*=8;0), all of whom were identified as Christian (53% Protestant, 47% Catholic) by their parents. On average, parents reported that their children attended religious services "once or twice a month" (*M* = 4.36, *SD* = .79) and that it was moderately important to them to raise their child in a religious tradition (*M* = 5.59, *SD* = 1.62). The sample was 82% White and 6% Asian American; 12% of the parents identified their child's race as "other."

Procedure. The procedure was identical to Study 3 with the exception that the Christian and Jewish characters were portrayed as relatively similar (Appendix G).

Results and Discussion

Replicating the findings from adults (Study 1), as well as children responding to quite distinct characters (Studies 2-3), participants demonstrated an implicit pro-Christian preference (mean D = .29, SD = .36, t (16) = 3.35, p < .01). Additionally, participants were significantly more likely to say that the Christian character was like them (Ns = 16 v. 1, binomial p < .01). Despite this acknowledgement of similarity, like adults—and unlike children responding to distinct characters—participants responded at chance levels to all other explicit questions, analyzed the same was as Studies 1-3 (social preference: M = .68, SD = .39, t (16) = 1.85, p > .05; good behavior: M = .65, SD = .34, t (16) = 1.79, p > .05; bad behavior: M = .44, SD = .39, t (16) = -.62, p > .05; American: $N_{\text{Christian character}}$ = 12, $N_{\text{Jewish character}}$ = 5, binomial p > .05).

Study 4 reflects a difference between the implicit and explicit systems in their early forms. Whereas the explicit system did not strongly differentiate between the two characters, the implicit system responded with a pro-Christian preference. Thus, the implicit system may be more sensitive to slight group differences, and implicit preferences in non-perceptual domains may emerge earlier in development.

To our knowledge, these are the first findings showing an implicit-explicit dissociation in children's spontaneous attitudes toward social groups. Thus, these results also demonstrate that the implicit-explicit dissociation observed among adults may not require the presence of social desirability motives. Such dissociations can be observed even among children too young to spontaneously provide socially desirable responses in intergroup contexts, indicating that such dissociations may emerge earlier than previously thought and that social desirability may not be a necessary component.

Furthermore, Study 4 points to a unique feature of children's attitudes in non-perceptually salient domains. In perceptually salient domains, explicit preferences emerge early

(Aboud, 1988; Baron & Banaji, 2006; Bigler & Liben, 2006). However, when children could not physically distinguish Christian and Jewish characters, and when these characters were portrayed as relatively similar, children's explicit preferences were attenuated. This suggests that explicit preferences in non-perceptual domains may emerge later than preferences in areas that are readily apparent to the senses.

Study 5

Study 5 addressed a limitation of Study 4, in which children categorized the faces of Christian and Jewish characters on the IAT. This procedure differed from the IAT completed by adults, who categorized words related to Judaism and Christianity. Thus, it may be the case that children's implicit attitudes reflect preferences for Christian individuals while adults' implicit attitudes reflect preferences for Christianity in general. To address this concern, participants in Study 5 categorized symbols representing Judaism and Christianity.

Method

Participants. Participants were 24 children (7 girls) between the ages of 6 and 8 years (M = 7;4), all of whom were identified as Christian (58% Protestant, 42% Catholic) by their parents. Parents reported that their children attended services "once or twice a month" on average (M = 3.52, SD = 1.73) and that it was moderately important to them to raise their child in a religious tradition (M = 4.39, SD = 2.23). The sample was 83% White and 4% Hispanic; 13% of parents self-identified their child's race as "other."

Procedure. The procedure was the same as Study 4 with one notable exception. Rather than seeing one Christian and one Jewish character, children viewed different characters (all White and gender-matched to the participant) on each trial. They then categorized the symbols appearing in the stories rather than characters' faces on the IAT.

Results and Discussion

Replicating earlier studies, participants exhibited an implicit pro-Christian preference (mean D = .24, SD = .33, t (22) = 3.48, p < .01). As in earlier studies, children were also significantly more likely to say that the Christian character was like them (Ns = 18 v. 6, binomial p < .05). No other explicit comparisons, calculated in the same way as in Study 1, reached significance (social preference: M = .58, SD = .35, t (23) = 1.16, p > .05; good behavior: M = .54, SD = .39, t (23) = .53, p > .05; bad behavior: M = .48, SD = .35, t (23) = -.30, p > .05; American: $N_{\text{Christian character}}$ = 17, $N_{\text{Jewish character}}$ = 7, binomial p > .05). Like adults, children showed stronger implicit rather than explicit preferences when presented with two similar characters.[7]

To examine the relationship between implicit and explicit results more formally, we conducted a set of point-biserial correlations on the combined data from Studies 4-5. Because correlation tests are particularly sensitive to sample size, and because the methods of the two studies are almost identical, collapsing across these samples allowed us to compute a more stable result. Despite the greater power of this test, correlations between children's IAT score and their responses to explicit questions did not reach significance on any item, all ps > .05.[8]

[7] We conducted a number of regression analyses on the data sets from each study to examine the influence of religiosity on preferences. In each analysis, we entered one relevant demographic variable (frequency of church attendance or importance of religious tradition) as the predictor and one preference measure (IAT score, reported preference, or ascriptions of good or bad behavior) as the dependent variable. In Study 1 only, the more importance adults placed on their religious tradition, the more likely they were to report pro-Christian direct social preferences (B = .11, SE = .04, Beta = .46, adjusted R^2 = .18, F (1, 30) = 8.00, p < .01) and the less likely they were to attribute negative behaviors to the Christian character (B = -.11, SE = .04, Beta = -.45, adjusted R^2 = .18, F (1, 31) = 8.03, p < .01). In Study 2 only, children who attended services more frequently (B = -.15, SE = .05, Beta = -.49, adjusted R^2 = .22, F (1, 31) = 9.91, p < .01) and children whose parents reported it was more important to raise their child in a religious tradition (B = -.10, SE = .03, Beta = -.54, adjusted R^2 = .27, F (1, 31) = 12.96, p = .001) were less likely to ascribe negative behaviors to the Christian character. In Study 5 only, children who attended religious services more often exhibited stronger implicit pro-Christian preferences (B = .10, SE = .04, Beta = .52, adjusted R^2 = .24, F (1, 20) = 7.54, p = .01). No other regressions reached significance.

[8] In the data set from Study 4 only, IAT scores correlated with children's responses to the question of which of the characters helped their friends with their schoolwork, Pearson's r = .45, p < .05. Participants who exhibited pro-Christian preferences on the IAT were more likely to select the Christian rather than the Jewish character in response to this question. However, this correlation drops to non-significance after controlling for multiple comparisons, and no other correlations reached significance, suggesting a Type 1 error.

One remaining concern focuses on the nature of results indicating a dissociation between implicit and explicit attitudes. It is possible that the null results reflect a measurement artifact rather than a true null result. For example, it is possible that the dependent measures were simply not strong or sensitive enough to detect an effect or that a low sample size contributed to the null findings.

We think this is unlikely for two reasons. First, the explicit questions remained consistent across studies, yet they detected differences in Studies 2-3. Additionally, the sample size was sufficient to detect significant effects on the implicit measure. Thus, we believe it is unlikely that a measurement or statistical artifact accounts for the results.

Second, to address the alternative view more formally, we re-ran the main analyses collapsing across similar studies to increase sample size. Participants were divided into two groups: those who participated in studies that revealed an overall absence of explicit preference (Studies 1, 4 [or the relevant pilot study] or 5, $N = 104$*)* and those who participated in studies that revealed an overall explicit pro-Christian preference (Studies 2-3, $N = 59$). For each group, we conducted the same analyses used in the original studies. To determine whether participants reported a pro-Christian preference, we calculated the proportion of trials on which participants reported a direct preference as well as the proportion of trials on which participants ascribed good and bad behaviors to the Christian character. Using one-sample *t*-tests, we then compared each proportion to .50.

Collapsing across studies that originally yielded a null result replicated the null findings (good behaviors: $M = .50$, $SD = .37$, $t\ (102) = 0.13$, $p > .05$; bad behaviors: $M = .51$, $SD = .39$, $t\ (101) = 0.26$, $p > .05$; direct preference: $M = .56$, $SD = .40$, $t\ (102) = 1.49$, $p > .05$). Individuals who participated in Studies 2-3, which revealed explicit preferences, reported direct pro-

Christian preferences (M = .68, SD = .40, t (56) = 3.51, p = .001) and ascribed more positive (M = .66, SD = .34, t (56) = 3.48, p = .001) and fewer negative (M = .29, SD = .34, t (57) = -4.66, p < .001) behaviors to the Christian character than would be expected by chance. A series of independent-samples t-tests indicated significant or near-significant differences between the two groups of studies on all explicit measures (good behaviors: t (157) = -2.47, p < .05; bad behaviors: t (157) = 3.66 p < .001; direct preference: t (157) = -1.90, p = .059). When sensitivity is increased by increasing sample size, the lack of explicit preference observed among adults and children responding to similar characters remains.

General Discussion

Five studies examined the relationship between children's and adults' implicit and explicit attitudes toward social groups (Table 2.1). Children, like adults, demonstrated implicit pro-Christian preferences in the absence of self-reported biases when presented with two similar characters. However, when judging between two quite distinct characters, children reported both implicit and explicit pro-Christian preferences (Figure 2.1).[9]

[9] We allowed all participants to complete the study, regardless of their religious affiliation. Because of the heterogeneous nature of the non-Christian sample and small *N*s, it is difficult to draw firm conclusions from these data. However, preliminary results suggest that non-Christian adults in Study 1 reported preferring the Jewish character (M = .34, SD = .41, t (31) = -2.15, p < .05) while exhibiting implicit neutrality (M = .17, SD = .53, t (32) = 1.79, p > .05). Additionally, non-Christian children in Studies 2, 4, and 5 were more likely to select the non-Christian character than the Christian character when asked which one was more like them, binomial ps < .05. Finally, non-Christian participants in Study 3 attributed fewer good behaviors to the Christian character than did Christian participants ($M_{\text{Christian}}$ = .68, $SD_{\text{Christian}}$ = .33, $M_{\text{non-Christian}}$ = .39, $SD_{\text{non-Christian}}$ = .21, t (49.31) = -3.59, p < .001). Across all of the studies reported here, these are the only items on which Christians and non-Christians reliably differed.

Table 2.1. Summary of Studies 1-5.

	N	*Ages*	*Exp. Preference*	*Imp. Preference*	*Religions Compared*
Study 1	33	21 – 48 years	None	Pro-Christian	Christianity, Judaism
Study 2	24	6 – 8 years	Pro-Christian	Pro-Christian	Christianity, Hinduism
Study 3	35	6 – 8 years	Pro-Christian	Pro-Christian	Christianity, Judaism
Pilot	30	5 – 7 years	None	N/A	Christianity, Judaism
Study 4	17	6 – 8 years	None	Pro-Christian	Christianity, Judaism
Study 5	24	6 – 8 years	None	Pro-Christian	Christianity, Judaism

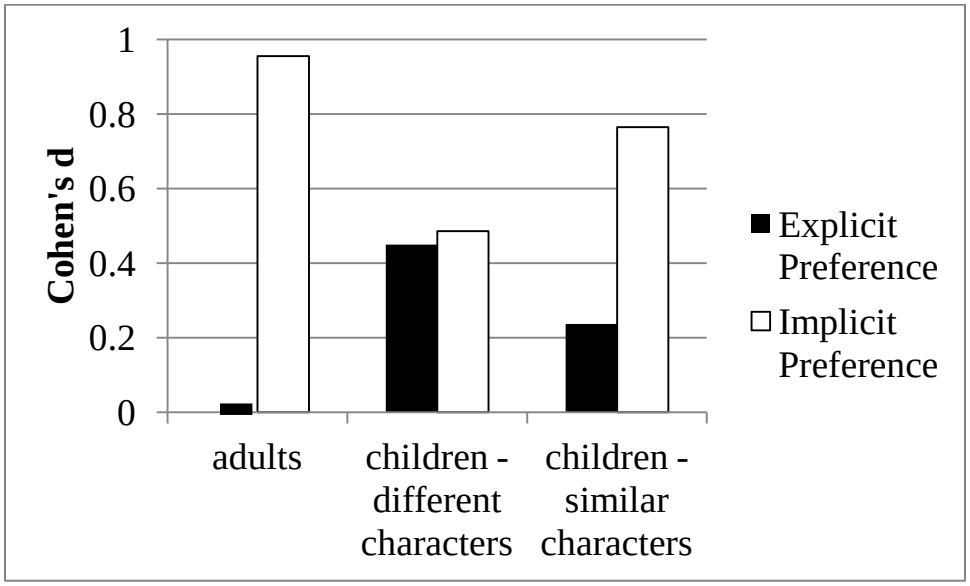

Figure 2.1. Effect size for explicit and implicit preferences among adults (Study 1), children judging quite distinct characters (Studies 2-3), and children judging similar characters (Studies 4-5; the explicit data from the pilot study are also included). Effect size for explicit measures was calculated as follows: (*M* - .50) / SD, where *M* = proportion of trials on which participants selected the Christian character when asked about their direct social preference (e.g., which character they would prefer to befriend) and *SD* = standard deviation of the mean. Effect size for implicit measures was calculated as follows: *M* / *SD*, where *M* = mean of IAT score and *SD* = standard deviation of IAT score. Positive scores represent pro-Christian preferences.

The Relationship between Explicit and Implicit Social Cognition

Social psychology offers a clear explanation for the dissociation between implicit and explicit associations among adults. Such dissociations have commonly been found among adults in domains such as racial preferences, preferences for thin people over overweight people, and gender stereotypes (Nosek, 2007). Researchers typically argue that adults are either unaware of their attitudes or do not wish to report them due to social desirability concerns (Greenwald & Banaji, 1995; Nosek, 2007). However, research with children suggests that they may not have learned to conceal their attitudes in intergroup domains (Baron & Banaji, 2006; Kinzler et al., 2009). Given these findings, one might have expected children's implicit preferences to match their self-reported attitudes. Indeed, this is the case when children judge between two quite distinct characters. However, when presented with two similar characters, children failed to report an explicit preference, leading to a dissociation similar to that observed among adults. If social desirability were a necessary component in the formation of this dissociation, then children of the age at which participants do not typically respond in socially desirable ways should have reported pro-Christian preferences that matched their implicit attitudes. The dissociation evidenced among the children responding to similar characters indicates that this mismatch can emerge even in the likely absence of social desirability motives.

The current work highlights an important difference between implicit and explicit attitudes. In their early stages, explicit attitudes appear to be relatively uninfluenced by small group differences. That is, when two people belong to groups that differ along some dimensions but share commonalities that distinguish them from other groups (e.g., monotheism), and when such commonalities are salient, the explicit system does not differentiate between them. Even in its earliest stages, however, the implicit system responds to small group differences. Young

children showed implicit but not explicit preferences for Christian over Jewish characters when they were described in relatively similar terms, demonstrating that the implicit system is more sensitive to small group differences than is the explicit system.

In addition to highlighting one distinction between implicit and explicit attitudes, the current work suggests that children may be unaware of their own attitudes when the two characters seem relatively similar. That is, children may require a strong contrast between different social identities in order to gain awareness of their own preferences. This interpretation is supported by the fact that children reported pro-Christian preferences when differences between the characters were highlighted. Implicit attitudes do not need to be articulated or understood; rather, they can be expressed in something as difficult to control as reaction times. Thus, it is possible that in some cases, an implicit measure such as the IAT can tap a preference of which children are not yet aware or which they cannot articulate. Such a result would fit well with studies in developmental psychology demonstrating differential outcomes using measures of responses that are difficult to control (e.g., looking time) and explicit or behavioral items (Baillargeon, Spelke, & Wasserman, 1985; Onishi & Baillargeon, 2005; Piaget, 1954; Wimmer & Perner, 1983). Though the current measures do not include a "correct" answer, similar processes could underlie the different responses to implicit and explicit measures.

Familiarity v. Similarity

This paper argues that children experience difficulty expressing preferences when judging between two relatively similar characters, leading children to express weaker intergroup preferences than those observed on implicit measures when two groups are portrayed as alike. An alternative account posits that children report preferences for what is familiar; when both groups are perceived as relatively familiar, no explicit preference emerges.

We think the latter account is unlikely to serve as the sole explanation for three reasons. First, when familiarity with the target items is statistically controlled, participants continue to exhibit implicit preferences on the IAT (Dasgupta et al., 2000; Ottaway et al., 2001; Rudman et al., 1999). Second, in Study 3, children learned about members of two familiar religions (Christianity and Judaism) yet reported pro-Christian preferences. Thus, the ability to report explicit preferences does not require the presence of a completely unfamiliar religion. Third, it may appear that by emphasizing dissimilarities, the stimuli also portrayed Judaism as an unfamiliar religion. However, the experimenter provided familiar labels ("Christian" or "Jewish") for both characters. Additionally, the Jewish stimuli included aspects of Judaism familiar to Christian children, including the mention of one God. Though it was impossible to create an entirely familiar character that was also highly distinct from the Christian character, the Jewish story did incorporate many religious aspects familiar to Christian children. Thus, rather than highlighting the unfamiliarity of the non-Christian character, we expect that the familiar religious label and religious tenets in Study 3 combined with the dissimilarity between the characters highlighted differences between the two groups.

Preferences for One's In-Group v. The Culturally Dominant Group

The current work investigates Christian children's pro-Christian preferences. This work was conducted in the United States, a country where most people self-identify as Christian (Pew Research Center, 2007). Thus, an open question remains: Do children's preferences reflect an in-group bias or a preference for the culturally dominant group?

Previous literature suggests that both hypotheses are plausible. For example, 5-12 year old Hispanic children showed implicit pro-Hispanic preferences when the comparison group was Black, suggesting that Hispanic children prefer racial in-group members as compared to racially

disadvantaged out-groups. However, Hispanic children of the same age demonstrated implicit neutrality when comparing Hispanic and White targets (Dunham, Baron, & Banaji, 2007). One interpretation of these data is that the children possessed both in-group and dominant-group preferences that canceled each other out in the Hispanic/White condition. Thus, it may be possible for children to possess both in-group preferences and dominant-group preferences, though, to our knowledge, no work has examined this question in the domain of religion.

Though the current experiments were not designed to address the issue of in-group v. dominant-group preferences, some preliminary data speak to this question. Specifically, across the experiments reported here, the 10 Jewish children who completed a Jewish/Christian IAT did not show the same robust pro-Christian preference demonstrated by Christian participants ($M_{\text{Jewish children}}$ = -.19, SD = .55, t (9) = -1.09, $p > .05$). If anything, the Jewish children's scores reflected a slight pro-Jewish preference, suggesting an in-group preference. However, this preference was non-significant, and the small sample size does not allow for firm conclusions. Additionally, it may be the case that Jewish children prefer in-group members whereas Christian children prefer dominant-group members; it is not possible to draw broad generalizations about one religious group by studying another. Nevertheless, these preliminary data suggest that in-group preferences may account for at least some religion-based attitudes. Addressing this issue in more depth remains a fruitful avenue for future research.

Preferences Based on Religion v. Minimal Groups

A potential explanation for the results reported here is that participants treat religion as a minimal group; that is, they do not come to the experiment with pre-formed religion-based preferences but rather, throughout the course of the experiment, infer that one character is like them along some dimension and therefore express preferences for that character. Under this

account, our results show that young children form social preferences based on minimal similarities to the self but do not demonstrate that children's preferences depend on religious similarity.

Such an account provides an unlikely explanation for the current data. Multiple studies conducted with children (Bigler et al., 1997; Dunham et al., 2011; Nesdale, Griffiths, Durkin, & Maass, 2007) and adults (Deffenbacher, Park, Judd, & Correll, 2009; DiDonato, Ullrich, & Krueger, 2010; Tajfel & Turner, 1979) demonstrate explicit as well as implicit in-group favoritism. For example, children explicitly ascribe more positive qualities (Bigler et al., 1997) and more positive behaviors (Dunham et al., 2011, Study 2) to peers who are randomly assigned to wear the same color t-shirt; they also report liking members of their minimal group better than out-group members (Dunham et al., 2011, Study 1). In the present research, however, children did *not* report pro-Christian preferences unless the comparison target was markedly different. In cases where the two targets were relatively similar, children did not report a preference for either character, suggesting that they were not simply responding to religious differences as a type of minimal group.

Social Desirability

An additional alternative explanation posits that the lack of explicit preferences observed in Studies 4-5 is the result of children's unwillingness to report their attitudes. Though social desirability may play some role in young children's social interactions, two pieces of evidence suggest that social desirability may not have been the main factor influencing children's responses in the current research. First, a social desirability account would typically predict null results on all explicit items used in this paper. For example, if children have learned that it is unacceptable to report preferring Christian over Jewish peers, they should not have reported pro-

Christian preferences in Study 3. However, when presented with information that made the Christian and Jewish characters seem quite distinct, children did not provide socially desirable responses. A nuanced version of the social desirability argument may claim that children were particularly sensitive to social desirability when learning about two relatively similar characters. Though it is unclear why this context would enhance children's socially desirable responding, the current research cannot definitively rule out this possibility.

Second, children of the ages tested in Studies 4-5 fail to demonstrate group-based socially desirable responding in a number of domains, including race (Baron & Banaji, 2006), language/accent (Kinzler et al., 2009), and minimal groups (Dunham et al., 2011). Though 6-8 year old children are capable of responding in socially desirable ways when they feel accountable to others (FitzRoy & Rutland, 2010; Rutland et al., 2005), children of this age have not spontaneously demonstrated group-based socially desirable responding in any domain previously studied. Even in the domain of race—a particularly sensitive area in which parents explicitly teach egalitarian ideals (Hughes et al., 2006; Lesane-Brown, 2006; Smith, Juarez, & Jacobson, 2011)—children report in-group and dominant-group biases. It is unclear why they should do so in the domain of religion.

Some evidence suggests that children as young as 3 years old may demonstrate non-group-based socially desirable responding. For example, preschool-aged children rated a drawing more positively in the presence of familiar individuals (Fu & Lee, 2007) and told white lies about an undesirable gift they had received (Talwar et al., 2007). Such results may indicate a form of social desirability in young children; for example, they may tell white lies in order to appear nice or grateful. These data differ from the current studies, however, which tested attitudes in an intergroup domain. Though 6-8 year old children appear sensitive to social context

and may alter their verbal responses to appear socially desirable in some situations, they do not appear to do so in intergroup contexts such as those based on race and language. The question of why socially desirable responding in interpersonal contexts emerges before socially desirable responding in intergroup contexts is a worthy topic for future research.

Conclusion and Future Directions

Three studies demonstrated an implicit-explicit dissociation; children, like adults, demonstrated implicit pro-Christian preferences but explicit neutrality when comparing two relatively similar characters. Two additional studies showed that these attitudes came into alignment when participants compared markedly different characters despite perceptual similarities between the characters. The current work demonstrates that perceptual differences are not necessary for preferences to emerge. Additionally, subtle differences in religion may be less salient than differences in other types of categories to young children on a conscious level; therefore, religious differences may have to be particularly pronounced in order to influence explicit preferences. On the other hand, implicit attitudes are sensitive to less sharply-differentiated religious differences. In cases where children are asked to choose between characters whose religions are similar and familiar, the IAT may tap preferences of which the children are unaware or which they may not yet be able to articulate.

The present findings raise crucial questions for future research concerning the forces that drive the preferences and attitudes observed in children. First, what aspects of religion drive children's preferences? Second, does religion have unique effects on children's social preferences, or do its effects resemble those found in other socially meaningful domains? Third, how might children respond to religious labels alone, without hearing any other individuating information about the characters? Fourth, to what extent do Christians' preferences reflect

preferences for their own group, and to what extent to their attitudes reflect preferences for the socially dominant group? Similarly, the extent to which pro-Christian preferences generalize to various sects (e.g., would Protestant children prefer Protestant over Catholic peers?) serves as an additional topic that might fruitfully be explored in future experiments. Future work can shed additional light on these factors' influence on intergroup attitudes in the domain of religion.

Part III

The formation of belief-based social preferences

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Abstract

Beliefs are invisible contents of the mind, yet young children appear able to reason about beliefs in their minds and those of others. In three experiments, we explored the previously unanswered question of the manner and extent to which young children assess types of beliefs. In Experiment 1, 6-9 year old children preferred peers who shared their own beliefs across several belief domains (fact, preference, and ideology) but selectively attributed pro-social behaviors only to those who shared their religious ideology. In Experiments 2 and 3, children additionally attributed pro-social behaviors to those who shared their ideological beliefs rather than those who shared their behavior. Together, these experiments demonstrate that children form social preferences based on unobservable mental states and that they weigh ideological beliefs particularly strongly when making morally relevant behavioral attributions.

The contents of others' minds ought to be a complete mystery given that they are enclosed in a black box. But among the remarkable features of social cognition is that humans' capacities for inference, generalization, and learning turn the black box into a seemingly transparent one. We behave as if we can see what other minds believe and directly assess their likeness to our own. In fact, adult humans are so proficient at making sense of other minds that the hard task of knowing and understanding what others believe is a commonplace occurrence in the daily work of interpersonal and intergroup relations. The goal of the present research is to understand the nature and origins of complex beliefs with ideological roots, such as religious beliefs, by exploring the preferences expressed by young children as a function of the beliefs of others.

Unlike adults, who have had vastly greater experience thinking about others' beliefs, children have less experience pondering what beliefs are, what it means to hold them, and what beliefs indicate about underlying disposition and behavior. It makes sense, then, that engaging with the contents of other minds should be more of a challenge for young children than for adults. However, evidence also points to the opposite, showing that young children have a relatively sophisticated grasp of what it means to hold a belief. Even before reaching elementary school, children understand that other people have beliefs, that other's beliefs vary in truth, and that they may match or differ from their own (Wellman, Cross, & Watson, 2001).

Nevertheless, what remains unknown is the extent to which children have an adult-like representation of others' beliefs. Specifically, do children, like adults, reason that beliefs provide crucial social information and serve as important indicators of future behavior? Do children also use beliefs to form social preferences? If so, we would learn that this feature of social cognition is sufficiently basic so as not to require much social experience to emerge. However, if

children's minds do not show the same pattern of using beliefs to form social preferences, we would learn that acquiring this feature of social cognition requires substantial experience with others' minds and emerges later in development.

A Basic Question of Social Relations

In thinking about others, a basic question that each person must ask and answer is the "goodness" of the other. Is this person likely to be friend or foe? Who will treat me well, and with whom will I prosper? From answers to such questions, we decide with whom to affiliate and whom to avoid (Fiske, 1991; Fiske, Cuddy, & Glick, 2007; Todorov, 2011).

Adults often answer such questions based on attitude and belief similarity, and a preference for those who share one's attitudes and beliefs is among the most robust findings in social psychology (Allen & Wilder, 1975; Byrne & Blaylock, 1963; Byrne & Wong, 1962; Smith, Williams, & Willis, 1967; Stillman, Guthrie, & Becher, 1960). More recent work supports these findings, demonstrating that adults prefer those who share their mental states (Chen & Kenrick, 2002; Houts, Robins, & Huston, 1996; McPherson, Smith-Lovin, & Cook, 2001; Montoya, Horton, & Kirchner, 2008; Pilkington & Lydon, 1997; Singh & Ho, 2000; Ullrich & Krueger, 2010).

Existing evidence also provides some insight into children's reasoning about affiliation and goodness. Relatively early in development, children begin to use social information to draw inferences about others. For example, children as young as three years of age attribute more negative behaviors to actors who performed negative behaviors in the past (Baron, Dunham, Banaji, & Carey, in press), and four-year-old children are more likely to report that characters previously described as "good" will go on to cause pro-social behaviors (Corrigan, 2003). Slightly older children seem to infer that those who are like them perform good behaviors; children in kindergarten and elementary school preferentially attribute pro-social behaviors to in-

group members (Dunham, Baron, & Carey, 2011; McGlothlin & Killen, 2010). Together, these findings suggest that young children use social cues such as previous behaviors and group membership to draw inferences about the goodness of others, but it remains unclear whether children take beliefs into account when forming their own social judgments.

Because beliefs are invisible, children may experience difficulty discerning the mental states of others, not to mention using such beliefs as the foundation for their own attitudes and behavior. Thus, children may not reveal preferences based on others' beliefs. However, if our tests reveal that young children do form social preferences on the basis of belief similarity, this would suggest that the belief-based preferences observed among adults emerge early in development. This may indicate that such preferences are fundamental aspects of social cognition that do not depend on extensive socio-cultural learning. To investigate children's emerging notion of beliefs, we draw on two distinct literatures, one focusing on the development of reasoning about beliefs and the other focusing on the formation of social preferences.

The Development of Reasoning about Beliefs

Most previous research on the development of belief understanding focuses on theory of mind, or the ability to reason about others' minds as distinct from one's own. The majority of work in this area has used variations of a single procedure that tests when and how children understanding others' beliefs and shows that around the age of four, children first develop the ability to report that others' beliefs may be incorrect (Wellman et al., 2001; Wimmer & Perner, 1983). Children also distinguish factual beliefs from those reflecting idiosyncratic attitudes (Banerjee et al., 2007; Flavell, Mumme, Green, & Flavell, 1992; Wainryb, Shaw, Langley, Cottam, & Lewis, 2004) and reason that religious beliefs differ from both factual and opinion-based beliefs (Heiphetz, Spelke, Harris, & Banaji, in press). In summary, previous research

suggests that the ability to reason about others' beliefs emerges early in life and that children distinguish different types of beliefs along a number of dimensions.

The Development of Group-Based Social Preferences

Young children readily express group-based preferences. Five-year-old White children prefer to engage in social exchanges with others who are White rather than Black (Kinzler & Spelke, 2011), White students attending racially homogenous elementary schools interpret ambiguous situations in a racially biased manner (McGlothlin & Killen, 2010), and German and Turkish preadolescents prefer to befriend those in their ethnic group (Jugert, Noack, & Rutland, 2011). Moreover, White six- and ten-year-old children—similarly to older adolescents and adults—also demonstrate implicit pro-White preferences (Baron & Banaji, 2006; Rutland, Cameron, Milne, & McGeorge, 2005).

Though race is perhaps the most often studied social group membership, other perceptually salient cues also influence children's preferences. For example, three-year-old children preferentially learn new information from peers who share their gender and age (Shutts, Banaji, & Spelke, 2010), and elementary school children prefer to play with children who belong to their gender group (Fabes, Martin, & Hanish, 2003; Martin & Fabes, 2001). Other perceptually salient cues, such as spoken language and accent, also influence children's preferences (Kinzler, Shutts, Dejesus, & Spelke, 2009). Even groups that are artificially created in the laboratory can shape social preferences. Children typically express greater liking for individuals randomly assigned to share their group membership, particularly when their attention is drawn to perceptual differences between the groups (e.g., t-shirt colors; Bigler & Liben, 2007; Dunham et al., 2011; Sherif, Harvey, White, Hood, & Sherif, 1954/1961; Tajfel, Billig, Bundy, & Flament, 1971).

In summary, previous research demonstrates that children prefer those who share their group membership, at least when group membership is based on perceptually salient cues inherent in groups that vary by race, gender, language/accent, and visible minimal groups. It is not known if children use the status of others' beliefs, which are invisible mental constructs, to form social preferences, and the current research investigates this question.

The Nature of Religious Ideologies

Among the many categories of beliefs, religious ideologies have special status. We use religion as an important example of ideological belief for several reasons. First, varieties of religious belief have been found cross-culturally (Atran, 2002; Boyer, 2001), and most people in the world are theists (Lynn, Harvey, & Nyborg, 2009). Second, religion influences a number of outcomes of interest to psychologists, including health and well-being (Gillum & Holt, 2010; Jackson & Bergeman, 2011; McCullough, Friedman, Enders, & Martin, 2009; McCullough & Laurenceau, 2005), trust in authority (Van Pachterbeke, Freyer, & Saroglou, 2011; Wisneski, Lytle, & Skitka, 2009), pro-social behavior (Norenzayan & Shariff, 2008; Preston, Ritter, & Hernandez, 2010; Shariff & Norenzayan, 2007), and intergroup bias (Gervais, Shariff, & Norenzayan, 2011; Johnson, Rowatt, & Labouff, 2010, 2012).

Third, unlike other ideologies important to adults, religion is influential even among young children. Taking advantage of this fact allows us to investigate the developmental origins of adults' cognition. Numerous studies demonstrate that, starting during the preschool years, children attribute fewer false beliefs and greater perceptual access to God rather than humans (Barrett, Newman, & Richert, 2003; Barrett, Richert, & Driesenga, 2001; Knight, Sousa, Barrett, & Atran, 2004; Richert & Barrett, 2005, though see Lane, Wellman, & Evans, 2010). Five-year-old children categorize others on the basis of religious differences (Diesendruck & haLevi, 2006)

and 10-year-old children use religious ideas to explain moral judgments (Nucci & Turiel, 1993). Throughout elementary school, children use religious ideas to inform their understanding of natural phenomena (Kelemen & DiYanni, 2005) and the afterlife (Bering, Blasi, & Bjorklund, 2005). Thus, it is clear that even young children are capable of reasoning about religious ideas and that such beliefs can play an important role in children's lives. What remains unclear is the extent to which such beliefs influence children's social preferences.

Unanswered Questions and Overview of Current Research

Previous studies have addressed several questions concerning the development of social preferences and belief-based reasoning, yet several questions remain. First, the preponderance of evidence comes from group-based distinctions that are perceptually salient, and the role of belief-based differences in development remains unexplored. More specifically, adults show preferences based on invisible group memberships such as political orientation and religious affiliation (McPherson et al., 2001; Nosek et al., 2007; Rowatt, Franklin, & Cotton, 2005). However, previous work on children's intergroup preferences has focused on perceptually salient domains; thus, the process by which adults come to prefer those who share traits that are not perceived with the senses remains unclear.

Some promising work indicates that children may show preferences for those who share their beliefs. For example, two-year-old children can recognize when another person shares their preference (Fawcett & Markson, 2010a), and three-year-old children prefer those who share their food and toy preferences (Fawcett & Markson, 2010b). However, in these studies, shared preferences were associated with visual cues such as pictures of food; therefore, it remains unclear whether the preferences found in this work reveal affinities based purely on invisible

mental states or on the perceptually salient cues associated with those beliefs. What remains to be explored is the child's use of another's beliefs in making social judgments.

Preferences that emanate from perceptually obvious interpersonal features and those that are more hidden, such as mental state features, may follow similar or divergent developmental trajectories. Both possibilities can be defended. Preferences based on more concealable categories may develop simultaneously to preferences based on perceptual cues because underlying both responses is a single cognitive mechanism of recognizing and using similarity and familiarity in social interaction. On the other hand, belief-based differences are hidden, which may make it harder to discern them and know how to utilize them in affiliation decisions. Developing this ability may take more time than learning to distinguish perceptually salient groups; thus, preferences based on invisible categories may appear later in life. The current work examines belief-based cognition across a wide age range to address the question of whether preferences in these domains develop differently than preferences in other areas.

Second, past work has typically focused on only two types of beliefs. Many studies, including most studies conducted on false-belief understanding, concern factual domains where another person's belief is clearly right or wrong. For example, numerous studies test children's understanding of beliefs concerning the location of particular objects—beliefs whose correctness is unambiguous and can easily be verified (see Wellman et al., 2001, for a review). In several notable exceptions, researchers have examined personal opinions, such as which flower is the prettiest (e.g., Banerjee et al., 2007; Flavell et al., 1992; Wainryb et al., 2004). However, other beliefs have typically remained untested. This oversight is surprising given that non-factual beliefs, including ideologies, are so important to social relations (Baray, Postmes, & Jetten, 2009; Cadge & Davidman, 2006; Haji, Lalonde, Durbin, & Naveh-Banjamin, 2011; Jost, 2006;

Ysseldyk, Matheson, & Anisman, 2010). Adult humans care a great deal about others' beliefs, yet psychologists know little about how such use of another's beliefs comes to be so important and pervasive in social life. To address this question, the current work examines the development of reasoning about religious ideologies in addition to the types of mental states that researchers have examined previously, such as factual and opinion-based beliefs.

In three experiments, we examined 6-11 year old children's preferences for members of groups demarcated by belief differences, and we varied the types of beliefs to study the importance of ideological beliefs (e.g., religious beliefs) as determinants of social preferences and social relations. The experimental procedure involved obtaining information about each participant's beliefs and then presenting children with peers who shared or did not share their viewpoints. If the adult form of belief-based social preferences emerges gradually over development, or if children lack the capacity to draw inferences from beliefs to form social relations, we should observe no belief-based preferences or affiliation choices among children.

Experiment 1

To investigate the influence of beliefs on children's social preferences, we presented participants with characters who shared and did not share their beliefs and asked participants to indicate their preference for those characters. We included children between 6 and 9 years old because previous research has shown that children of this age are capable of responding to self-report questions and are able to successfully differentiate others' mental states from their own. Additionally, children of this age do not typically provide socially desirable responses unless aspects of the environment have been manipulated to encourage socially desirable responding (Baron & Banaji, 2006; FitzRoy & Rutland, 2010). Explicitly using a wide age range allowed us to test for potential developmental differences.

To investigate the generalizability of our findings across belief domains, we tested three kinds of beliefs. Because previous research has investigated children's reasoning about factual and opinion-based beliefs, we used these two belief categories to allow for comparison with prior studies. Additionally, we investigated a third type of belief important to adults—namely, religion.

Method

Participants. Participants were 81 6-9 year old children (73% White, 5% African-American, 9% Asian-American, 1% Hispanic, 11% some other race; 52% female; M_{age} = 7;9). During the study, parents completed a demographic questionnaire asking them to identify the religious affiliation, in any, of their child. Parents identified their child's religious affiliation as Protestant (25%), Catholic (30%), Jewish (12%), Muslim (3%), atheist or agnostic (11%), and "other" (15%). Participants were recruited in the northeast United States from departmental databases and local museums; they received a sticker or small toy after completing the study.

Procedure. Children were seated with an experimenter in front of a computer. In Part 1, the experimenter elicited children's religious, factual, and opinion-based beliefs. For example, the experimenter said, "Some people think that God knows all of our thoughts, and some people think that only we can know all of our thoughts. Which do you think?" (religious item); "Which river do you think is the longest river in the world? Do you think it's the Amazon or the Nile?" (factual item); and, "What is your favorite color?" (opinion item; for other items in each category, see Appendix H). Factual beliefs were chosen based on pre-testing with adults; adults did not reliably know the correct answer to any of the factual items we used, leading to somewhat greater confidence that any preferences expressed by children indicate a preference for people who share one's own beliefs rather than people that know the correct answer.

In Part 2, the experimenter displayed photographs of two White children of the same gender, approximate age, and attractiveness (as measured by a pre-test administered to adults) as each other. The experimenter attributed opposing beliefs to each character; one agreed with the participant while the other disagreed. The photographs were counterbalanced in the following ways: first, each character was portrayed as agreeing with approximately half of the participants and disagreeing with the other half. Second, each character was presented on the left side of the screen for approximately half of the participants and on the right side for the other half. Third, across participants, each photograph was paired with each type of belief. Beliefs concerned preferences (e.g., "This child thinks that [participant's favorite color] is the prettiest color, and this child thinks that [different color] is the prettiest color"), facts (e.g., "This child thinks that the Amazon is the longest river in the world, and this child thinks that the Nile is the longest river in the world"), and religion (e.g., "This child thinks that God knows all of our thoughts, and this child thinks that only we can know all of our thoughts"). Children were exposed to four trials for each belief type (Appendix H).

Experiment 1 contained two main variables of interest measured by questions adapted from Dunham and colleagues (2011) and Kinzler and colleagues (2009). First, one item measured *affiliation*: "Which of these children do you think you would rather be friends with?" Second, *goodness* was measured by one good-behavior item ("One of these children helped his/her friends with their schoolwork. Which one of them do you think did that?") and one bad-behavior item ("One of these children was very naughty in school. Which one of them do you think did that?"). Third, one item served as a manipulation check ("Which of these children do you think is more like you?").

Participants responded to one question on each trial, and the belief-question pairings were counterbalanced across participants. For example, on one trial, one participant might hear, "This child thinks that God knows all of our thoughts, and this child thinks that only we can know all of our thoughts. Which of these children do you think you would rather be friends with?" For another participant, this belief item was paired with a different question (e.g., the good-behavior item). The order of beliefs and questions was randomized and counterbalanced across participants.

Results and Discussion

The proportion of trials on which participants selected the similar character served as the dependent measure for both perceived similarity and affiliation. These proportions were compared to chance (.50) using binomial tests. To analyze goodness data, we subtracted the number of times participants selected the similar character when asked about bad behaviors from the number of times they selected the similar character when responding about good behaviors. Thus, positive values indicate participants attributed more positive than negative behaviors to those who are like them, while scores close to 0 indicate participants attributed equal numbers of positive and negative behaviors to similar characters. We employed this measure, rather than analyzing responses to good and bad behavior questions separately, to reduce the number of comparisons and therefore decrease the likelihood of Type I error.

Preliminary analyses. A series of independent-samples *t*-tests assessed the potential influence of religious background (Christian vs. non-Christian)[10] on responses to questions concerning goodness. Because affiliation was a dichotomous variable, we analyzed the influence

[10] We split the sample into Christians and non-Christians for two reasons. First, we believe the difference between the culturally dominant group and all other groups to be theoretically important. Second, this was the only split that resulted in approximately equal cell sizes.

of religion on this outcome measure using 2x2 contingency tables. Participant religious background did not exert a significant influence on affiliation or goodness; thus, we collapsed across this category in subsequent analyses.[11]

A series of binomial tests revealed that participants were significantly more likely than chance to select the character that shared their beliefs, regardless of belief type, when asked to select the more similar character (83% made this selection when asked about religion, 77% when asked about facts, and 88% when asked about opinions, all *p*s < .001). Cochran's *Q*-test was non-significant, indicating that belief type did not exert a significant main effect. This result indicates that we successfully manipulated the pairs such that in each pair, one character was perceived as more similar to the participants than the other.

Primary analyses. A series of binomial tests revealed that participants were significantly more likely than chance to select the character that shared their beliefs regardless of belief type when asked which character they would rather befriend (i.e., with which character they would rather affiliate; 73% made this selection when asked about religion, 63% when asked about facts, and 74% when asked about opinions, all *p*s < .05; Figure 3.1). Cochran's *Q*-test was non-significant, indicating that belief type did not exert a significant main effect.

[11] To examine the influence of additional background variables (gender and location of experiment) on affiliation, we analyzed a series of 2x2 contingency tables. Each table consisted of one background variable and one dependent measure (e.g., responses to the affiliation measure when it was paired with a factual belief). None of these tests reached significance. A series of independent-samples *t*-tests probed the influence of background variables on goodness. One significant effect emerged: children who participated in a museum were more likely than children who participated on-campus to ascribe positive behaviors to those who shared their factual beliefs (M_{museum} = .34, SD_{museum} = .60, M_{campus} = -.04, SD_{campus} = .64, t (79) = -2.70, p < .01). However, the *p*-value fell above standard significance levels after applying a Bonferroni correction, suggesting a Type 1 error. Therefore, we collapsed across all demographic variables in subsequent analyses.

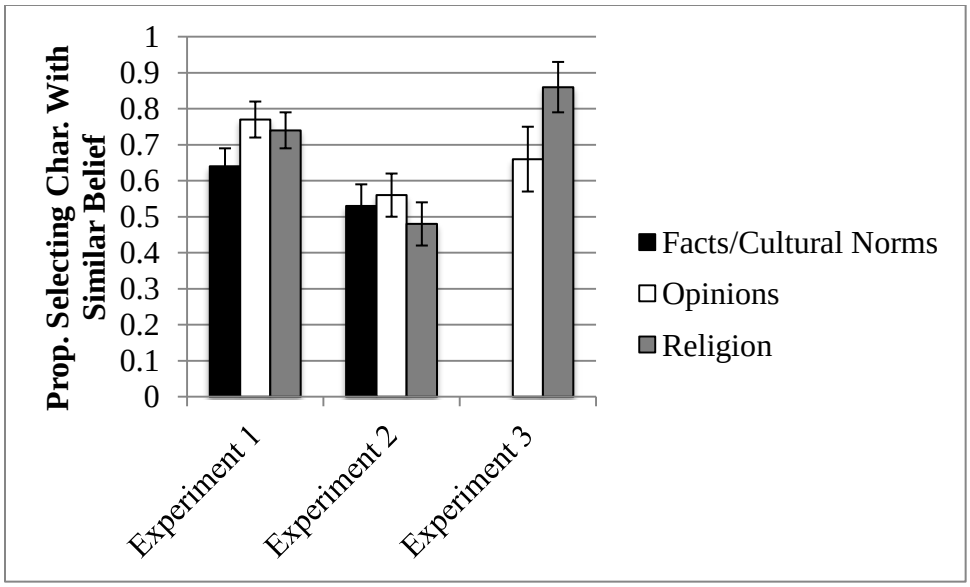

Figure 3.1. Children's social preferences based on belief similarities. Experiment 3 did not include factual or culturally normative beliefs. Error bars represent the standard error of the mean.

One-sample *t*-tests using 0 as the comparison value indicated that, when determining the goodness of the characters, participants ascribed more positive rather than negative behaviors to the character that shared their religious beliefs (M = .40, SD = .71, Cohen's d = .56, t (76) = 4.96, $p < .001$). However, they were equally likely to ascribe good and bad behaviors to characters who shared their factual beliefs (M = .11, SD = .65, Cohen's d = .17, t (80) = 1.53, *ns*) and opinion-based beliefs (M = .06, SD = .71, Cohen's d = .08, t (77) = .80, *ns*). A one-way repeated-measures ANOVA revealed a significant main effect of belief type, F (2, 146) = 5.59, $p < .01$, partial $\eta^2 = .07$. Post-hoc pairwise comparisons indicated that religion differed significantly from both factual beliefs, F (1, 76) = 9.09, $p < .01$, partial $\eta^2 = .11$, and opinion-based beliefs (F (1, 73) = 8.33, $p < .01$, partial $\eta^2 = .10$); factual and opinion-based beliefs did not significantly differ from each other ($F < 1$; Figure 3.2).

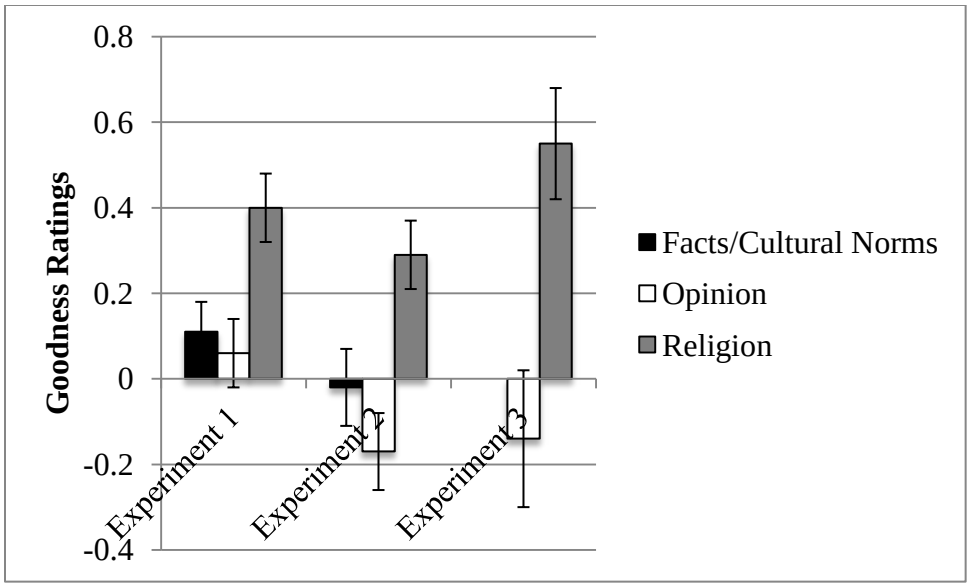

Figure 3.2. Children's ascriptions of positive and negative behaviors to characters that share their beliefs. Positive values indicate that children ascribed more positive rather than negative behaviors to characters who shared their beliefs. Values near 0 indicate that children ascribed equal numbers of positive and negative behaviors to characters who shared their beliefs. Experiment 3 did not include factual or culturally normative beliefs. Error bars represent the standard error of the mean.

To examine the influence of participant age on responses, we used two analyses. First, a series of regression analyses investigated the effect of age on children's responses to the goodness item. In each analysis, the participant's age in days was entered as the predictor variable, and one dependent measure (responses to goodness in the domain of religion, fact, and opinion) was entered as the outcome variable. Second, to examine the influence of participant age on responses to questions concerning affiliation, we used logistic regression analyses, entering participant's age in days as the covariate and responses to the affiliation item as the outcome variable. All analyses were non-significant, indicating that age did not influence children's responses.[12]

[12] Prior to conducting Experiment 1, we conducted a pilot experiment with 45 6-9 year old children. The procedure was similar to Experiment 1 with two exceptions. First, children's religious beliefs were inferred from parental identification of the child's religion; children were not directly asked to state their own religious views. Second, we used two affiliation questions, two good-behavior questions, and two bad-behavior questions to ensure that results

Discussion. Across all domains tested, children preferred to affiliate with peers who shared their beliefs. Additionally, children selectively attributed pro-social behaviors only to peers who shared their religious beliefs. This result points to three aspects of children's cognition.

First, even young children formed social preference on the basis of invisible beliefs, suggesting that children do not require perceptual differences between individuals or groups in order to form preferences. Rather, starting at the age of six years or earlier, children prefer those who share their beliefs in a number of domains.

Second, even young children distinguished religious beliefs from the other types of beliefs tested here. Children as young as six reasoned that individuals who shared their religious beliefs—but not their factual or opinion-based beliefs—were especially likely to perform pro-social behaviors. Children may form this mental association because religious beliefs are more strongly associated with particular actions than are other sorts of beliefs. We elaborate on this point in the General Discussion.

Third, despite early-emerging preferences for those who shared their factual and opinion-based beliefs, children ascribed equal numbers of positive and negative behaviors to characters who shared their views in these domains. Their social preferences did not lead them to conclude that the character they liked more was a better person overall; rather, children distinguished between their own desire to affiliate with individuals and those individuals' propensity to

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were not an artifact of a particular item. Across domains, participants preferred to affiliate with characters who shared their beliefs rather than those who disagreed (means represent proportion of trials on which participants selected the character who shared their beliefs: $M_{religion} = .70$, $SD_{religion} = .33$, Cohen's $d = .61$, $t\ (21) = 2.88$, $p < .01$; $M_{fact} = .73$, $SD_{fact} = .36$, Cohen's $d = .64$, $t\ (23) = 3.11$, $p < .01$; $M_{opinion} = .81$, $SD_{opinion} = .25$, Cohen's $d = 1.24$, $t\ (23) = 6.19$, $p < .001$). However, children did not use information about belief similarity to selectively attribute pro-social behaviors in any domain tested. In Experiment 1, we queried children about their own religious beliefs to determine whether this more nuanced measure would lead children to attribute more pro-social behaviors to those who shared their religious views. To allow time for this without taxing children's attention spans, we used only one question of each type (affiliation, good behavior, and bad behavior).

perform pro-social behaviors. For young children, such a distinction represents a sophisticated understanding that one's own preference does not necessarily indicate that the person one prefers is better in all respects than less well-liked individuals.

Children's ability to distinguish between their own attitudes and others' behaviors in the domain of beliefs differentiates this area from other group memberships, including minimal groups. That is, even when children are randomly assigned to groups based on t-shirt color—groups with which the children had no prior experience and which are not socially meaningful outside the experimental context—they both express preferences for and attribute more pro-social behaviors to members of their in-group rather than the out-group (Bigler & Liben, 2007; Dunham et al., 2011). However, when presented with characters that shared or did not share their factual and opinion-based beliefs, children failed to attribute more positive than negative behaviors to their in-group members despite their preferences for characters who shared their beliefs.

Experiment 2

The result from Experiment 1 may have been obtained because of a particular aspect of the experimental procedure. The effect may have been particularly robust because children shared 100% of relevant traits with one character and 0% of relevant traits with the opposing character. In daily life, such simple dichotomies are rarely present. Instead, even those who share our beliefs may differ from us along other dimensions. To mimic the complexity of social cognition and also to put the question of belief similarity to a tougher test, in Experiment 2 we created mixtures of matches between the subject and the target, with belief versus behavior being the basis of similarity. Such a test was able to provide evidence about the relative weight given to beliefs over other features of similarity, i.e., behavior.

We selected behaviors as the contrast to beliefs for two reasons. First, behaviors are more concrete than are beliefs. Whereas beliefs are invisible and must be inferred from words or actions, behaviors can be relatively more readily perceived and interpreted. Because children readily form preferences based on perceptual groupings (Aboud, 1988; Baron & Banaji, 2006; Dunham et al., 2011; Fabes et al., 2003; Kinzler et al., 2009; Kowalski & Lo, 2001; Martin & Fabes, 2001), it is reasonable to expect that they would prefer those who share their behaviors over those who share their beliefs. If children do not show such a preference, this would provide evidence that non-perceptual cues can play an equal or more important role in the formation of social preferences (see Baron et al., in press, for evidence of the importance of non-perceptual cues in the domain of noun labeling).

Second, the differences between beliefs and behaviors are particularly subtle. The idea that beliefs lead to behaviors is intuitive and children, like adults, may rely on information concerning beliefs to the extent that they regard such information to provide reliable cues to behavior. If this is the case, we should observe children preferring those who share their behaviors rather than their beliefs.

Method

Participants. Participants were 63 6-10 year old children (73% White, 5% Black, 6% Asian-American, 3% Hispanic, 10% some other race; 56% female; M_{age} = 8;9). Parents identified their child's religious affiliation as Protestant (11%), Catholic (33%), Jewish (14%), Muslim (3%), atheist or agnostic (13%), and "other" (24%). We increased the age range by one year to see whether older children might respond differently from younger children. For example, older children may be more aware of social desirability norms, and their responses could help determine the extent to which social desirability might dampen the effects observed in

Experiment 1. Participants were recruited using a departmental database and received a small toy; all children participated on campus.

Procedure. In Part 1, children answered questions about their own beliefs and behaviors. Questions concerned three domains: religion, opinions, and cultural norms. For example, children were asked, "Do you or do you not think that there is only one God?" (religious belief) and, "Do you or do you not celebrate God with other people?" (religious behavior). Cultural norms replaced the factual beliefs used in Experiment 1 for two reasons. First, a large degree of cultural consensus is an important aspect of the types of factual beliefs we used. Though children do not necessarily know the correct answers, knowledgeable adults have arrived at one answer that experts generally perceive as an accurate reflection of the state of the world. Thus, to better generalize the results, we sought to expand to other types of beliefs with a large amount of cultural consensus. Second, it is difficult to determine what a factual behavior might be; however, cultural norms are associated with both beliefs (e.g., thinking that brushing one's teeth is healthy) and behaviors (e.g., brushing one's teeth regularly).

After responding to questions about their own beliefs and behaviors, participants viewed pairs of characters (represented by photographs similar to those used in Experiment 1 and counterbalanced in the same fashion) on a computer screen. The experimenter attributed a belief and a behavior to each character and then asked the participant a question about the two characters. In each pair, one character ostensibly shared the participant's belief but not his or her behavior while the other character shared a behavior but not a belief with the participant. For example, someone who responded affirmatively to both sample questions above saw one trial where the experimenter said, "This child thinks that there is only one God, but (s)he does not

celebrate God with other people. This [other] child celebrates God with other people, but (s)he does not think that there is only one God" (Appendix I).

Items were paired such that both of the following conditions were met: 1) The belief and behavior belonged to the same category (religion, opinion, or cultural norms), and 2) The belief and behavior had previously been rated as equally important by a sample of adults. Thus, any preference for the character that shared one's beliefs likely was not driven by a preference for a character with whom one shared a more important trait.

After the experimenter finished attributing beliefs and behaviors to each character in a pair, she asked children one of the questions used in Experiment 1. Question-item pairings and order of categories were counterbalanced as in Experiment 1.

Results and Discussion

Preliminary analyses. We examined the effects of participant religion as described in Experiment 1. A 2x2 contingency table revealed a significant relationship between participant religion and responses to the similarity question in the cultural norms category. Eighteen Christians selected the similar character whereas 11 selected the dissimilar one; 10 non-Christians selected the similar character while 20 selected the dissimilar one ($p < .05$). Participant religion did not significantly influence any other responses. Because this was an unexpected effect, and because the *p*-value fell above the threshold of significance after applying a Bonferroni correction, we collapsed across religion in subsequent analyses.[13]

Primary analyses. Responses to the question, "Which of these children do you think is more like you?" served as the measure of perceived similarity. This question no longer served as

[13] The effect of gender was analyzed as in Experiment 1. Gender did not influence responses to any dependent measures; therefore, we collapsed across this variable in subsequent analyses.

a manipulation check because each character shared one important commonality with participants. A series of binomial tests revealed that participants were more likely than chance to select the character that shared their beliefs when asked about opinions (63% made this choice; $p < .05$) but more likely than chance to select the character that shared their behaviors when asked about religion (63% made this choice; $p < .05$). When asked about cultural norms, participants were equally likely to select the character that shared their beliefs (46%) and their behaviors (*ns*). A significant Cochran's *Q*-test ($p = .01$) indicated a main effect of category. Follow-up McNemar's tests revealed that responses to religion items differed significantly from responses to opinion items ($p < .01$); no other pairwise comparisons reached significance.

Responses to the question, "Which of these children do you think you would rather be friends with?" served as the measure of affiliation. Across categories, a series of binomial tests did not reveal a preference for either character (48% selected the character that shared their religious beliefs, 52% selected the character that shared their culturally normative beliefs, and 56% selected the character that shared their opinions, all *p*s > .10). Cochran's *Q*-test was non-significant, indicating that category type did not exert a significant main effect.

The data on goodness were analyzed similarly to Experiment 1. We subtracted the number of times participants selected the character that shared their beliefs when asked about bad behaviors from the number of times participants selected the character that shared their beliefs when asked about good behaviors. Thus, positive values indicate participants attributed more positive than negative behaviors to the character that shared their beliefs, while negative values indicate participants attributed more positive behaviors to those who shared their behaviors. A series of one-sample *t*-tests using 0 as the chance comparison revealed that participants attributed more positive rather than negative behaviors to the character that shared

their religious beliefs (*M* = .29, *SD* = .63, Cohen's *d* = .46, *t* (62) = 3.58, *p* = .001). Furthermore, they attributed more positive behaviors to the character that shared their opinion-based behaviors rather than beliefs (*M* = -.17, *SD* = .68, Cohen's *d* = -.25, *t* (62) = -2.02, *p* < .05). Participants did not use information about culturally normative beliefs and behaviors to differentially attribute positive and negative actions (*M* = -.02, *SD* = .71, Cohen's *d* = -.03, *ns*). A repeated-measures one-factor ANOVA revealed a main effect of category, *F* (2, 124) = 6.84, *p* < .01, partial η^2 = .10. Follow-up analyses revealed that responses to religious items differed both from responses to opinion-based items (*F* (1, 62) = 12.61, *p* = .001, partial η^2 = .17) and from responses to culturally normative items (*F* (1, 62) = 6.67, *p* = .01, partial η^2 = .10); however, responses to opinion-based items and culturally normative items did not significantly differ from each other (*F* (1, 62) = 1.44, *ns*).

We examined the influence of participant age on responses using a series of linear and logistic regressions, as described in Experiment 1. All analyses were non-significant, indicating that age did not influence children's responses.

Discussion. Experiment 2 offered an important replication of the behavioral ascription results obtained in Experiment 1, in which children attributed more positive rather than negative behaviors to characters who shared their religious beliefs. The new result obtained in Experiment 2 showed that participants attributed more positive behaviors to peers who shared their religious beliefs even when the contrasting character shared their meaningful behaviors. This result highlights the uniqueness of religion as compared with the other categories tested. Additionally, the finding is particularly surprising given the subtlety of the manipulation. As discussed above, beliefs and behaviors are closely interrelated; nevertheless, in the domain of religion, participants were more likely to attribute pro-social behaviors based on a similarity of beliefs, not behaviors.

Additionally, if children relied on information about beliefs in order to infer someone's behaviors, it would be logical for them to preferentially select the characters who shared their behaviors in Experiment 2. However, this is not what we observed. Rather, children responded at chance levels to questions about whom they would rather befriend. This finding indicates that children did not privilege information about beliefs when deciding about whom they liked more. However, it also suggests that when children do privilege information about beliefs (as in Experiment 1), they are not using information about beliefs as a proxy for information about behaviors.

Experiment 3

Experiment 2 demonstrated that children selectively attributed pro-social behaviors to characters who shared their religious beliefs rather than behaviors. The purpose of contrasting beliefs with behaviors was to determine whether children emphasized beliefs to a greater extent than a category that is perceptually salient, closely associated with beliefs, and influential in everyday life. In creating contrasting characters along the dimensions of belief and behavior, however, it was also necessary to create characters who espoused contradictions. For example, children who responded that they believed in only one God (belief) and celebrated God with other people (behavior) learned about a character that celebrated God with other people but did not believe in only one God, a combination that may have been complex if not seemingly inconsistent to participants who were raised in a predominantly Christian, monotheistic culture. To address this issue, we conducted Experiment 3 by creating differences of belief and behavior that did not lead to such unusual characters.

Method

Participants. Participants were 59 6-11 year old children (78% White, 2% Black, 10% Asian-American, 3% Hispanic, 7% some other race; 53% female; M_{age} = 8;10). Again, we increased the age range to investigate potential differences in responding between older and younger children. Parents identified their child's religious affiliation as Protestant (20%), Catholic (29%), Jewish (5%), Muslim (3%), atheist/agnostic (15%), and "other" (15%). Recruitment was identical to Experiments 1-2.

Procedure. In Part 1, children answered the religion and opinion-based belief questions used in Experiment 1 and were assigned to a behavioral similarities condition. For half of the participants, the behavior was non-perceptual. These children selected one of two pieces of paper from the experimenter's closed hands. If they selected the paper marked "head," they tapped their head for 60 seconds; if they selected the paper marked "tummy," they rubbed their stomach for 60 seconds. Later in the session, participants were told that one character had performed the same behavior as them, but they did not observe the individual performing the behavior. Like participants in Experiment 2, these children were told that someone shared their behavior without having the chance to observe the shared behavior take place.

Because prior work points to the importance of perceptual similarities in children's social preferences, we also included a condition in which behaviors were based on physical cues. Thus, the remaining half of the participants selected one of two colored pieces of paper from the experimenter's closed hands and then put on a shirt of the same color as the paper they had selected (a procedure used in previously published research, e.g., Dunham et al., 2011).

All participants then answered 8 questions related to the behavior they had performed. These questions matched the format of the questions about participants' beliefs and were intended to ensure that beliefs and behaviors were equally salient to participants. Approximately

half of the participants answered questions about their own beliefs first while the other half performed a behavior and answered behavior-related questions first.

In Part 2, participants viewed similar photographs as those used in Experiments 1-2 on a computer screen. In eight experimental trials, the experimenter attributed a belief and behavior to each character and then asked the participant a question about the two characters. In each pair, one character ostensibly shared the participant's belief but not his or her behavior, while the other character shared a behavior but not a belief with the participant. For example, someone who reported that she believed God could do miracles and was assigned to wear a red t-shirt saw one trial where the experimenter said, "This child thinks that God can do miracles, just like you do, and she is wearing a green shirt. This [other] child is wearing a red shirt, just like you are, and she thinks that no one can do miracles."

In four control trials, the experimenter simply revealed that one character shared a behavior with the participant while the other did not, without providing any information about beliefs. After the experimenter finished describing each character in a pair, she asked children one of four questions used in Experiments 1-2, counterbalanced in the same way.

Results and Discussion

Preliminary analyses. As in previous studies, participant religion failed to reliably influence responses to the dependent measures; thus, subsequent analyses collapsed across this variable. Similarly, we used independent-samples *t*-tests to examine the effect of behavior (perceptual vs. non-perceptual) on goodness. Because affiliation was a dichotomous outcome measure, we examined the effect of behavior type on affiliation using 2x2 contingency tables.

Behavior type did not reliably influence responses to either affiliation or goodness items; therefore, we collapsed across this variable in subsequent analyses.[14]

Primary analyses. Responses to the question, "Which of these children do you think is more like you?" served as the measure of perceived similarity. A series of binomial tests revealed that participants were significantly more likely than chance to select the character that shared their beliefs when asked about opinions (90% made this choice; $p < .001$) and religion (92% made this choice; $p < .001$); however, participants did not differ from chance in the control condition (49% selected the character that had nothing in common with them, *ns*). A significant Cochran's *Q*-test ($p < .001$) indicated a main effect of category. Follow-up McNemar's tests revealed that responses to control items differed significantly from responses to opinion and religion items (*p*s < .001); opinion and religion items did not differ from each other.

Initial results indicated that participants failed to show a preference for the character that shared their behavior when the contrasting character had no commonalities with the participant. Thus, in addition to analyzing the full data set, we conducted the same analyses on the 29

[14] A 2x2 contingency table revealed a significant relationship between participant religion and affiliation in the control category. Five non-Christians reported that they would rather be friends with the character that shared their behavior whereas 10 selected the character that had nothing in common with them; 22 Christians selected the character that shared their behavior while 10 selected the character that had nothing in common with them. These differences were statistically significant, $p < .05$. Additionally, Christian children were more likely to attribute positive behaviors to the character that shared their behavior in the control condition ($M_{\text{Christian}} = -.29$, $SD_{\text{Christian}} = .74$, $M_{\text{non-Christian}} = .27$, $SD_{\text{non-Christian}} = .70$, $t\ (44) = 2.43$, $p < .05$), whereas non-Christian children were more likely to attribute positive behaviors to the character that shared their behavior in the religion condition ($M_{\text{Christian}} = .50$, $SD_{\text{Christian}} = .67$, $M_{\text{non-Christian}} = -.06$, $SD_{\text{non-Christian}} = .03$, $t\ (47) = -2.56$, $p < .05$). Children who participated in the museum were also more likely to attribute positive behaviors to the character that shared their behavior in the control condition ($M_{\text{museum}} = -.24$, $SD_{\text{museum}} = .71$, $M_{\text{laboratory}} = .24$, $SD_{\text{laboratory}} = .79$, $t\ (52) = 2.35$, $p < .05$). Additionally, a significant relationship emerged between behavior type and affiliation in the religion category. Ten children in the perceptual condition reported that they would rather be friends with the character that shared their behavior, whereas 19 selected the character that shared their beliefs; all 27 children who participated in the non-perceptual condition selected the character that shared their beliefs. These differences were statistically significant, $p < .001$.

As in earlier studies, gender did not significantly influence responses to any dependent measures. Because the few significant effects of background factors were unexpected and did not cohere into a consistent pattern, we collapsed across all background variables in subsequent analyses.

children who preferred to affiliate with the character that shared their behavior over the character that had nothing in common with them.[15] Because these children demonstrated a baseline preference for the character that shared their behavior, one might predict that this preference would lead them to prefer the character that shared this cue over the character that shared their beliefs; any belief-based preferences in this sub-set of children yield particularly strong evidence in favor of the hypothesis that beliefs are particularly important.

Replicating the results from the full data set, participants were more likely than chance to select the character that shared their beliefs when asked who was more like them in both the religion category (97% made this choice; binomial $p < .001$) and the opinion category (93% made this choice; binomial $p < .001$). McNemar's test revealed that responses to religion and opinion-based items did not significantly differ from each other.

A binomial test revealed that participants reported that they would rather affiliate with (befriend) the character that shared their religious beliefs rather than the character that shared their behavior (86% of participants made this choice; $p < .001$). Though the majority (66%) of participants also selected the character that shared their beliefs in the opinion category, this result

[15] We selected children on the basis of their responses to the affiliation question because this item has shown the most robust effects in prior research. In our full sample, responses to the affiliation item were correlated with responses to the goodness item ($r = .37$, $p < .01$), suggesting that children's preferences for the similar character cohered and were not driven by chance alone.

Results from analyses conducted on the full data set were as follows: First, participants were significantly more likely than chance to select the character that shared their beliefs when asked about opinions (73% made this choice; binomial $p < .001$) and religion (78% made this choice; binomial $p < .001$); however, participants did not differ from chance in the control condition (44% selected the character that had nothing in common with them, *ns*). A significant Cochran's *Q*-test ($p < .001$) indicated a main effect of category. Follow-up McNemar's tests revealed that responses to control items differed significantly from responses to opinion and religion items (*p*s = .001); opinion and religion items did not differ from each other.

Second, participants attributed more positive rather than negative behaviors to the character that shared their religious beliefs ($M = .37$, $SD = .75$, t (56) = 3.72, $p < .001$); no other behavioral comparisons reached significance. A repeated-measures one-factor ANOVA revealed a main effect of category, F (2, 106) = 3.86, $p < .01$. Follow-up pairwise comparisons revealed that responses to religious items differed both from responses to opinion-based items (F (1, 56) = 11.83, $p = .001$) and from responses to control items (F (1, 53) = 9.38, $p < .01$); however, responses to opinion-based items and control items did not significantly differ from each other.

no longer reached significance, perhaps due to a drop in power. McNemar's test revealed that responses to religion and opinion-based items did not significantly differ from each other.

Goodness data were analyzed similarly to Experiments 1-2. As before, a one-sample *t*-test using 0 as the comparison revealed that participants attributed more positive rather than negative behaviors to the character that shared their religious beliefs (M = .55, SD = .69, Cohen's d = .80, t (28) = 4.33, $p < .001$); however, participants responded at chance levels when attributing behaviors to characters in the opinion category. A paired-samples *t*-test revealed a significant difference in responses to these two categories (t (28) = 3.70, p = .001, Cohen's d = .69). Even children who exhibited a baseline preference for the character that shared their behavior placed a stronger emphasis on beliefs, replicating the patterns observed in the full dataset.

As in Experiments 2-3, we examined the influence of participant age among individuals with a baseline behavioral preference on responses using a series of logistic and linear regressions. All analyses were non-significant, indicating that age did not influence children's responses.

Discussion. The purpose of Experiment 3 was to determine the extent to which children demonstrated belief-based preferences when beliefs were compared with behavioral similarities that did not create contradictory characters. Replicating Experiment 1, children preferred to affiliate with characters that shared their religious beliefs, demonstrating that beliefs in this domain are a stronger determinant of social preference than are behavioral similarities. Additionally, children attributed more pro-social behaviors to those who shared their religious views, demonstrating that similarity in the domain of religion influences perceptions of goodness.

General Discussion

Three experiments examined the influence of others' mental states on the development of social judgments. Experiment 1 demonstrated that 6-9 year old children preferred to affiliate with peers who shared their religious, factual, and opinion-based beliefs, and that the magnitude of this preference remained constant regardless of the type of belief tested. Experiments 2-3 revealed that children selectively attributed positive behaviors to those who shared their religious beliefs.

Belief-Based Preferences

The current studies demonstrate that children prefer to affiliate with peers who share their beliefs when those characters are contrasted with individuals who do not share a socially meaningful trait with the participant. This result joins two literatures that have, up to now, largely remained separate.

First, the present research contributes to the literature on children's developing understanding of mental states. By the age of four, children can articulate their understanding that some beliefs are false and may differ from their own (Wimmer & Perner, 1983), and during the elementary school years, children differentiate different beliefs along this dimension. For example, they recognize that while factual beliefs may be false, opinion-based beliefs have no one true answer (Banerjee et al., 2007; Flavell et al., 1992; Heiphetz et al., in press; Wainryb et al., 2004). However, previous work has not examined the ways in which reasoning about others' minds might influence preferences for those whose beliefs differ from our own. Beliefs do not exist in isolation—they are a part of every individual we meet. Thus, the question of how belief-based reasoning influences developing social judgments is crucial, yet it has not been

investigated previously. The current work contributes to the literature on belief-based understanding by demonstrating that children use others' beliefs as a basis for social judgments.

Second, the current finding expands psychologists' theoretical understanding of the nature of intergroup preference. Previous research demonstrates that adults prefer those who share their beliefs (Houts et al., 1996; McPherson et al., 2001). The current work demonstrates that the origins of this preference lie early in development, suggesting that prolonged exposure to others' beliefs is not necessary for belief-based preferences to emerge. Rather, such preferences appear to be in place as early as six years of age.

Belief-Based Judgments of Goodness

When asked who had performed a pro-social or anti-social behavior, children responded differently than when indicating a simple affiliation preference. In Experiment 1, children used information about beliefs to infer a character's behavior in only one instance: when the belief similarity was based on the participant's own religious beliefs. In this case only, children ascribed more positive rather than negative behaviors to the character that was more like them. The uniqueness of religious beliefs persisted in Experiments 2-3, where participants ascribed more positive behaviors to those who shared their religious beliefs rather than behaviors.

Children's behavioral ascriptions indicate that beliefs function differently than other social categories. In perceptually salient domains, children commonly attribute more positive rather than negative behaviors to in-group members (Dunham et al., 2011; McGlothlin & Killen, 2010). However, when groups are differentiated by invisible mental states, children typically do not attribute more positive rather than negative behaviors to in-group members. This indicates that rather than perceiving mental state differences as a type of minimal group, children reason uniquely about invisible social categories.

Thus, the current work suggests that there is something special about mental state differences. However, it also indicates that not all belief-based differences are the same. In particular, children reason differently about religion than any of the other categories tested, and this may have occurred for several reasons. First, religion may be more socially meaningful than other types of cultural norms, opinions, or facts. In fact, religion is so meaningful that humans have split themselves into social categories on the basis of religious differences and often refer to themselves using noun labels (e.g., "I am a Christian"), potentially underscoring the importance of this category (Gelman & Heyman, 1999; Waxman, 2010). On the other hand, it is uncommon to see such categorization on the basis of any other domains studied in the current research (e.g., "I am a blue-lover"). However, if children responded differently to religion because they perceived belief differences in this domain to be the most meaningful, it is unclear why the preference for those who share one's religious beliefs was not stronger than preferences based on other belief domains in Experiment 1.

A second explanation posits that beliefs and behaviors are most closely knit in the domain of religion. As described above, mental states and actions are interwoven across many areas of life; however, this connection may be particularly strong in religious domains. It is here that children learn that some beliefs and behaviors are good or right while others or bad or wrong. For example, children raised in monotheistic families may learn that it is important to believe in only one God and, because of that belief, it is also important to obey God. Even religions that emphasize behaviors, such as Judaism and Catholicism, nevertheless narrate behaviors as arising from or being caused by beliefs. For example, confession may be of primary importance to a Catholic, but this importance most likely stems from her belief in God (otherwise, the practice of confessing to God makes little sense). Likewise, keeping kosher may

be particularly important to some Jews as a way of maintaining community ties, but even though this is not explicitly a religious belief, the belief ("maintaining community ties is important") leads to the behavior (keeping kosher). Children who observe belief-based explanations of behaviors may learn to place particular weight on information about someone's religious beliefs, a connection that does not occur in domains where beliefs are not narrated as the primary causes of behavior. For example, children do not learn that it is important to believe that blue is the prettiest color and that therefore it is also important to wear blue clothing.

Consistency Across Development

The current work demonstrates that children across a wide span of ages respond similarly to peers who share and do not share their beliefs. This is a surprising result given developments in other skills across these ages. For example, between the ages of 6 and 11 years, children experience increases in executive function (Best, Miller, & Jones, 2009; Romine & Reynolds, 2005) and social desirability concerns (Baron & Banaji, 2006; FitzRoy & Rutland, 2010). The latter developmental change makes it particularly surprising that no developmental differences emerged in the current work. That is, even the oldest children did not appear to find it socially undesirable to report belief-based social preferences. Examining the causes of this effect remains a fruitful avenue for future research.

It appears that at least some aspects of the ways children use others' beliefs to inform social preferences and judgments remain stable across development. It may be the case that children do not require vast experience with others' beliefs for these aspects of social cognition to emerge. Rather, even limited experience encourages children to prefer those who share their beliefs and to associate religious similarity with pro-social behaviors, and increasing exposure to others' beliefs does not seem to change these initial judgments. This finding suggests that adults'

preferences for those who share their beliefs have their origins in early development and that their formation does not require large amounts of socio-cultural experience.

Conclusion

This dissertation examined two main questions. First, how do children and adults reason about others' beliefs? Second, how does such reasoning influence attitudes toward those who do not share one's own beliefs?

The Development of Reasoning about Others' Beliefs

Part I of this dissertation investigated the development of reasoning about others' mental states. Specifically, this work compared reasoning about ideological beliefs with factual beliefs, which reflect objective truths about which there exists broad cultural consensus, and preference-based beliefs, which reflect subjective and idiosyncratic views about which no broad consensus necessarily exists. Adults as well as 5-10 year old children distinguished religious beliefs from both fact and preference, showing that even young children reason distinctly about religious beliefs as compared with the other mental states tested and that this aspect of cognition remains stable across the lifespan. Thus, it appears that a great deal of social experience is not necessary for the formation of adults' reasoning in this domain; rather, adults' responses may represent a vestige of an earlier developmental state.

These findings are of theoretical importance for two reasons. First, they extend prior work on children's reasoning about beliefs. A great deal of literature has investigated how children represent others' factual beliefs (for reviews, see Flavell, 1999; Russell, 2005; Wellman, Cross, & Watson, 2001) and others' preference-based beliefs (e.g., Fawcett & Markson, 2010a, 2010b; Repacholi & Gopnik, 1997), with some research focusing on children's distinctions between matters of fact and matters of preference (Banerjee et al., 2007; Flavell, Mumme, Green, & Flavell, 1992; Wainryb, Shaw, Langley, Cottam, & Lewis, 2004). However, how children represent others' religious beliefs as compared with fact and preference has remained

unclear. These results demonstrate that, like adults, children as young as five years old can differentiate religious ideologies from other types of mental states.

Second, these results show a surprising developmental continuity. Because children have far less experience with their own and others' beliefs than do adults, it would have been reasonable to suppose that they would represent belief-based disagreements differently than do adults. However, the results showed that children as young as five distinguished religious beliefs from fact and preference in the same way as adults, suggesting that vast amounts of socio-cultural experience are unnecessary for this aspect of cognition to emerge. Instead, it appears to be in place in adult-like form early in development.

These findings are also of practical importance because they suggest that children may not show strong social preferences for those who share their own religious and preference-based beliefs. In these domains, children did not respond that individuals who disagreed with their own beliefs must be wrong. Therefore, it is possible that children would show tolerance toward those who disagree with them in these domains, reasoning that, if those who disagree with them are not necessarily wrong, they may be equally worthy friends and playmates as in-group members. On the other hand, even young children demonstrate social preferences in a number of domains tested in previous work, including race, gender, age, native language/accent, and minimal groups. Thus, it is possible that children have a generalized tendency to prefer those who are like them, and that this tendency would manifest even in a domain that is not perceptually salient and one in which children recognize that a plurality of opinions is acceptable. Parts II and III further investigated these issues.

The Development of Belief-Based Social Preferences

Part II investigated the role of religious identity in children's and adults' social preferences, and three important effects emerged. First, Christian adults showed implicit pro-Christian preferences but explicit egalitarianism, replicating numerous findings in other socially sensitive domains (e.g., race) suggesting that adults report more egalitarian attitudes than those observed on implicit measures. Second, like adults, Christian 6-8 year old children demonstrated implicit pro-Christian preferences regardless of the non-Christian characters' religious affiliation. Third, Christian children reported pro-Christian preferences only when the two characters were portrayed as markedly different from one another (e.g., one character was Christian while the other was Hindu). These results demonstrate that the seeds of religious bias are sown early in life and suggest that children require a strong difference between two characters in order to articulate their preferences.

In the world outside the laboratory, religious similarity can occur along a number of dimensions. For example, one's religious in-group members typically share at least some of one's beliefs and rituals in addition to possessing the same group label. To account for this confluence of factors, Part II provided participants with a great deal of varied information about each character. Having established that children and adults show religion-based social preferences, we next sought to investigate the role of beliefs in this preference. Part III demonstrated that children preferred peers who shared their beliefs in a variety of domains—including fact, preference, and religion—but they selectively attributed positive behaviors only to characters who shared their religious beliefs. This finding suggests that a special link between religious similarity and moral cognition may emerge relatively early in development.

These results are of theoretical importance because they demonstrate that even young children form preferences based on social cues that are not perceptually salient. Though some

work in developmental psychology argues that perceptual distinctiveness is necessary for social preferences to emerge (Bigler & Liben, 2007), the current work joins more recent research (e.g., Baron, Dunham, Banaji, & Carey, in press) in highlighting the importance of non-perceptual features in the early formation of social preferences. Pointing as they do to the early emergence of intergroup bias in the domain of religion, these results also suggest that social experience does not play a strong role in this area. That is, adults' belief-based social preferences appear to be the vestiges of an earlier developmental state that do not require a great deal of socio-cultural experience to emerge.

These results also have applied implications for the world outside the laboratory. Specifically, these findings suggest several ways that intergroup bias might be reduced. For example, because Christian children did not report pro-Christian preferences when similarities between characters of different religions were highlighted, it is possible that teaching children about similarities across different religions might attenuate their biases in this domain (see also Gaertner & Dovidio, 2000).

Contributions and Implications

Taken together, these studies provide three main lessons about social cognitive development, intergroup bias, and religious cognition.

First, this dissertation shows that children and adults show remarkably similar patterns of responding across a variety of questions. Like adults, children as young as the preschool and early elementary school years distinguish religious ideologies from factual and preference-based beliefs. And, like adults, children demonstrate implicit preferences for those who share their own religious identity or belong to the majority religious group of the participants' culture. Under some conditions (e.g., when judging between two similar characters), children even show an

implicit-explicit dissociation, demonstrating implicit pro-Christian preferences while failing to report a preference for any religious group. A finding of implicit bias in the face of explicit egalitarianism is a trademark result in the adult literature (Brauer, Wasel, & Niedenthal, 2000; Devine, 1989; Fazio, Jackson, Dunton, & Williams, 1995; Fazio & Olson, 2003; Greenwald & Banaji, 1995; Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005; Nosek et al., 2007); however, previous work with children has found that, absent any manipulations to increase their socially desirable responding, children report biases that match their implicit preferences (e.g., Baron & Banaji, 2006; Dunham, Baron, & Carey, 2011; Newheiser & Olson, 2012). The current work demonstrates that children may be more similar to adults than previously thought, showing that humans do not require a great deal of socio-cultural experience to develop at least some aspects of religious cognition and intergroup bias. Rather, adult responding in these areas may reflect early-emerging forms of cognition.

Second, this dissertation demonstrates that even young children form social preferences based on others' religious identities and beliefs. Some previous scholars have theorized that children require perceptual group markers in order to form social preferences (e.g., Bigler & Liben, 2007). The current work dovetails with other recent research (e.g., Baron, Dunham, Banaji, & Carey, in press) showing that children can form preferences even in the absence of perceptual cues differentiating social categories. This shows that preferences based on group memberships that are not necessarily perceptually salient, such as religious groups in a secular culture, may emerge earlier than previously thought and influence children's lives to a greater extent than previously understood.

Third, this dissertation shows that ideological beliefs, such as religion, may differ from other sorts of beliefs that people may have, and that even young children are sensitive to this

difference. For example, the current findings revealed that children and adults did not equate ideological beliefs with either fact or preference but appeared instead to treat ideology as its own separate category (Part I). Additionally, while children preferred peers who shared their beliefs in a variety of domains, they selectively attributed pro-social behaviors only to peers who shared their religious ideologies (Part III). Ideology may differ from other beliefs for a variety of reasons. For example, children and adults may perceive ideological beliefs as especially predictive of future behavior. Additionally, or alternatively, children and adults may perceive ideological beliefs in particularly essentialist terms—as fundamental, unchangeable aspects of other human beings. Future work can explore these possibilities.

Future Directions

In addition to the future directions raised above, this work raises a number of other questions for future research.

First, what mechanisms might underlie the development of reasoning about beliefs? Follow-up work to Part I of this dissertation (Heiphetz, Spelke, Harris, & Banaji, under review) suggests one potential mechanism. Namely, reasoning about beliefs might be driven by the types of information that different categories of beliefs are perceived to provide. Both children and adults reason that correct factual beliefs reveal more information about the world in general than about the person who holds the belief, that preference-based beliefs reveal more about the individual than about the world, and that religious beliefs reveal a moderate amount of information in both domains. However, this is unlikely to be the only mechanism underlying belief-based cognition, and future work can explore additional mechanisms. One fruitful research direction might focus on essentialism, or the notion that some social categories have an innate "essence" or "true nature" that distinguishes them from other categories (e.g., Gelman, 2003).

Future work can examine the extent to which essentialism influences reasoning about others' beliefs. For example, it is possible that children reason about others' ideological beliefs in an essentialist fashion, which would indicate that children perceive such beliefs to be an innate aspect of who a person is rather than a socially learned trait that can change over time.

As discussed above, a second follow-up question might focus on the ways in which ideological beliefs are similar to and different from other types of beliefs. What accounts for differences between ideologies and other types of beliefs, and are there differences within the broad domain of ideology? For example, the fact that many languages have noun labels that indicate individuals' ideological positions (Christian, atheist, Democrat, Republican, etc.) but do not have noun labels to indicate other types of beliefs (what is a name for someone whose favorite color is blue or someone who believes that germs are very small?) may indicate that ideological beliefs are more important in most societies than are other types of beliefs (Gelman & Heyman, 1999; Waxman, 2010). Even within the domain of ideology, it is possible that some types of ideologies are more important than others (or can become more important in the right context), and this might lead to different types of reasoning about different categories of ideologies. For example, a Republican living in a predominantly Democratic city might place particular importance on her political affiliation because it differentiates her from her neighbors, and this might lead her to prioritize others' political beliefs above other types of ideologies when making friendship choices.

Relatedly, a third follow-up question might focus on the development of moral judgment. It is common for laypeople to associate morality with religious beliefs, but the similarities and differences between these two types of ideologies have not been tested empirically. Future work might address the extent to which these ideologies are linked in people's minds. For example, do

children and adults reason that behaviors are more moral when performed for religious rather than secular reasons? Might children and adults reason that moral beliefs, like religious beliefs, occupy an intermediate position between fact and preference? If so, what manipulations might encourage participants to perceive moral beliefs as more factual or more preference-like? Such questions are of both theoretical and applied importance, as they would enhance scientific understanding of the ways in which people learn to reason about ideological beliefs and also provide insight into possible interventions aimed at enhancing the ease with which people live in a diverse society.

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Appendix A: Experiment 1 Stimuli, Part I

Note: Each belief was preceded by the phrase, "This child/person thinks that. . ."

Matters of Doctrine:

1) There is only one god vs. there are many gods

2) God sent Jesus to Earth a long time ago to make the world a better place vs. God will send someone to Earth to make the world a better place, but that person hasn't come yet

3) We can only learn about God by reading the Bible vs. We can only learn about God by reading the Quran

4) After they die, some people go to heaven vs. After they die, some people come back to Earth as different creatures

Matters of Faith:

1) God can hear us when we pray out loud vs. Only other people can hear us when we pray out loud

2) After people die and are buried, some of them go to heaven vs. After people die and are buried, everyone stays here in the ground

3) God knows all of our thoughts vs. Only we can know all of our thoughts

4) God can do miracles vs. Nobody can do miracles

Factual Beliefs:

1) Germs are very small vs. Germs are very big

2) People have just one brain, and it is in their head vs. People have two brains, and there is one in each foot

3) Dinosaurs only lived a long time ago vs. There are dinosaurs alive right now

4) George Washington was the first President of the United States vs. Harry Potter was the first President of the United States

Familiar Preferences:

1) [Participant's favorite color] is the prettiest color vs. Green is the prettiest color

2) [Participant's favorite fruit] are the tastiest fruit vs. Oranges are the tastiest fruit

3) [Participant's favorite game] is the most fun game to play vs. Tag is the most fun game to play

4) [Participant's favorite song] is the best song vs. Twinkle Twinkle Little Star is the best song

Unfamiliar Preferences:

1) [Participant's favorite color] is the prettiest color vs. Chartreuse is the prettiest color

2) [Participant's favorite fruit] are the tastiest fruit vs. Santols are the tastiest fruit

3) [Participant's favorite game] is the most fun game to play vs. Mankala is the most fun game to play

4) [Participant's favorite song] is the best song vs. Ah Mon Bon Chauteau is the best song

Appendix B: Experiment 2 Stimuli, Part I

Note: Each belief was preceded by the phrase, "This child/person thinks that. . ." Before reading any of the items below, the experimenter said, "I'm going to tell you about a planet far away from here. It's called Tamsena, and it looks like this." The experimenter then pointed to a picture of an unfamiliar planet before moving on to the first experimental item.

Religious Beliefs:

1) All of the invisible spirits on Tamsena live under the ground vs. All of the invisible spirits on Tamsena live in the tops of the trees

2) The only way to get an invisible spirit on Tamsena to hear you is to talk to the spirit while standing next to a fire vs. The only way to get an invisible spirit on Tamsena to hear you is to talk to the spirit while swimming in a river

3) The only way to learn about the spirits on Tamsena is to read the blicket vs. The only way to learn about the spirits on Tamsena is to read the spoodle

4) Invisible spirits on Tamsena only protect everyone during the day vs. Invisible spirits only protect everyone on Tamsena at nighttime

Factual Beliefs:

1) Tamsena is ruled by a king. The first king of Tamsena was called Benjamin Smith vs. The first king of Tamsena was called Daniel Jones

2) There are two mountains on Tamsena vs. There is only one mountain on Tamsena

3) On Tamsena, there is a type of tree called the grinkle tree. Grinkle tree seeds are so small that no one can see them vs. Grinkle tree seeds are so big that people can trip over them

4) Animals called saramads only lived on Tamsena a long time ago vs. There are saramads alive on Tamsena right now

Preferences:

1) Au Mon Bon Chateau is the best song vs. Ils Etaient Trois Garcons is the best song

2) Mankala is the most fun game to play vs. Ubuthi is the most fun game to play

3) Santols are the tastiest fruit vs. Tanjongs are the tastiest fruit

4) Chartreuse is the prettiest color vs. Coquelicot is the prettiest color

Appendix C: Character Descriptions, Study 1, Part II

Note: Character names and introductions were counterbalanced across participants. Female characters were named Amy, Sarah, or Jill. Male characters were named Ethan, Jacob, or Dan. In addition to the two introductions presented here, a third introduction read, "This is [name]. [Name] is a little girl [boy] who lives near a big city with her [his] mommy and daddy. [Name] has a cat named Smokey. She [he] plays with him [her] often."

This is Amy. Amy is a little girl who lives with her mommy and daddy and their pet dog, Sparky. Amy enjoys playing with Sparky and teaching him new tricks.

Amy's favorite holiday is Hanukkah. Every year she and her parents put a big menorah in their window. Amy loves lighting a bright new candle for each day of Hanukkah.

Amy loves celebrating God on Hanukkah and during the rest of the year. She has a lot of fun worshipping God with her friends at their synagogue. Amy believes that God made a miracle happen to people long ago who needed oil to light a lamp. He made a little oil last for a very long time! Amy does not believe that God ever had a son.

Amy doesn't go to church on Sundays like the other girl I will tell you about. Amy goes to synagogue with her parents on Saturdays. They sing special songs asking God to make the world a good place. They also pray and listen to stories from Torah, which is some people's Holy Book. The rabbi explains what the stories mean. Amy loves learning about people who lived long ago, especially famous rabbis like Rabbi Hillel!

Amy's rabbi taught her the prayers she should say during the day and when she goes to bed at night. Amy likes learning new prayers and saying them every day. She especially likes the prayer to say before falling asleep.

This is Sarah. Sarah is a little girl who lives with her parents and older sister, Jane, in a big city. They live in a blue house near Sarah's school.

Sarah's favorite holiday is Easter. Every year she gets to paint pretty eggs with her mommy and daddy. She also loves looking for the candy the Easter bunny leaves her!

Sarah loves celebrating God on Easter and during the rest of the year. She has a lot of fun worshipping God with her friends at their church. Sarah believes that God has a son who died, but God made a miracle happen and brought his son back to life on Easter Sunday. Sarah does not believe that people can know God without knowing about his son, Jesus.

Sarah doesn't go to synagogue on Saturdays like the other girl I have told you about. Sarah goes to church with her parents on Sundays. They listen to the choir and join in singing special songs. They say prayers together and listen to the pastor read something from the Bible. The pastor explains what all the Biblical stories mean. Sarah loves learning about people who lived in the past, especially Jesus and his loyal followers!

Sarah's pastor says that God hears us when we pray, so Sarah says her prayers every night. She thanks God for her friends and family, and she asks God to bless them. Sarah also asks God to bless their church.

Appendix D: Questions Used in Studies 1-5, Part II

One of these children stole a toy from a neighbor. Which of these children do you think did that? (all studies)

One of these children was very naughty in school and didn't do their work. Which of these children do you think did that? (all studies)

One of these children made cookies for all of their friends. Which of these children do you think did that? (all studies)

One of these children helped their friends with their schoolwork. Which of these children do you think did that? (all studies)

Which of these children do you think is nicer? (Study 1)

Which of these children would you rather babysit? (Study 1)

Which of these children goes to church every Sunday? (Study 1)

Which of these children has a menorah at home? (Study 1)

One of these children believes that God had a son who died but who came back to life on Easter. Which of these children believes that? (Study 1)

One of these children believes that God made a miracle happen a long time ago when He made a little bit of oil last for a very long time. Which of these children believes that? (Study 1)

One of these children ate a peanut butter and jelly sandwich for lunch. Which of these children do you think did that? (Studies 1-2)

Which of these children do you think is an American? (Studies 2-5)

Let's pretend that you are having a party and you've invited all of your friends. Then, your mom says that you can invite one other person. If you could, which of these children would you invite? (Studies 2-5)

Which of these children would you most like to be friends with? (Studies 2-5)

Which of these children do you think is more like you? (Studies 2-5)

Appendix E: Character Descriptions, Study 2, Part II

Note: Girls heard the same story with female characters (and thus female nouns and pronouns).

This boy is Hindu. He celebrates many gods on Diwali and during the rest of the year. He worships many gods with his friends at their temple. He believes that each god does a different thing, like Brahma, who creates everything in the world, and Vishnu, who protects everything. This boy believes that Brahma created seven people who helped him make everything else in the world. He thinks that there are many gods, and he thinks it is silly to believe that Jesus is the son of God. Here is a picture of some of the gods that this boy believes in.

And this boy is Christian. He celebrates God on Easter and during the rest of the year. Here is a picture of some of the eggs this boy paints on Easter. He worships God with his friends at their church. He believes that God has a son named Jesus who died, but God made a miracle happen and brought Jesus back to life on Easter Sunday. This boy believes that Jesus used to live on earth and will come back to earth someday. He thinks that there can only be one god, and he thinks it is silly to believe in many gods.

This boy is Hindu, and he goes to temple with his parents. He doesn't go to church like the other boy. He washes himself in a river and takes off his shoes before he goes inside the temple. Sometimes he and his parents stay very quiet while worshipping the gods, and sometimes they worship by saying words in Sanskrit. This boy loves learning about the different gods and goddesses, especially Shiva, Brahma, and Vishnu. Here is a picture of a temple down here. One of the ways you can tell is because it has this symbol on it called an Om, and a symbol like that usually means something is Hindu.

And this boy is Christian, and he goes to church with his parents. He doesn't go to temple like the other boy. In church, this boy and his parents listen to the choir and sing special songs.

They pray together and listen to the pastor read something from the Bible. The pastor explains what all the Biblical stories mean. This boy loves learning about people who lived long ago, especially Jesus and his loyal followers. Here is a picture of a church down here. One of the ways you can tell is because it has a cross on top like this, and a cross like this usually means that something is Christian.

This boy is Hindu, and his favorite holiday is Diwali. Every year he gets to light pretty lamps with his parents and put them all outside. He also loves squirting different-colored water on his friends! Here is a picture of some Diwali lamps down here.

And this boy is Christian, and his favorite holiday is Easter. Every year he gets to paint pretty eggs with his mommy and daddy. He also loves looking for the candy the Easter bunny leaves him! Here is a picture of the Easter bunny down here.

This boy is Hindu. Every morning, this boy puts flowers, fruit, and other kinds of food in front of a statue of one of the gods. Then he asks the gods to bless the food he has given them. Here is a picture of a statue of one of the gods down here.

And this boy is Christian. Every night, this boy says his prayers before he goes to bed. He thanks God for his friends and family, and he asks God to bless them. He also asks God to bless their church. This boy folds his hands like this when he prays.

Appendix F: Character Descriptions, Study 3, Part II

Note: Girls heard the same story with female characters (and thus female nouns and pronouns).

This child is Jewish. He celebrates God on Lag Ba'Omer and during the rest of the year. Here is a picture of some of the bonfires this boy lights on Lag Ba'Omer. He worships God with his friends at their temple. He believes that a long time ago, a man was teaching people about God for many days. God made a miracle happen and kept the sun up until the man was done teaching. This boy celebrates Lag Ba'Omer to remember that. This boy thinks that another name for God is Elohim, and he thinks it is silly to believe that another name for God is Jesus.

And this child is Christian. He celebrates God on Easter and during the rest of the year. Here is a picture of some of the eggs this boy paints on Easter. He worships God with his friends at their church. He believes that Jesus died a long time ago and God made a miracle happen and brought Jesus back to life on Easter Sunday. This boy celebrates Easter to remember that. This boy believes that Jesus used to live on earth and that he will come back to earth someday. This boy thinks that another name for God is Jesus, and he thinks it is silly to believe that another name for God is Elohim.

This child is Jewish, and he goes to temple with his parents. He doesn't go to church like the other boy. In temple, this boy and his parents stand up together while someone opens the doors to the ark at the front of the room. Sometimes he and his parents stay very quiet while worshipping God, and sometimes they worship by saying words in Hebrew. This boy loves learning the different prayers. Here is a picture of a temple down here. One of the ways you can tell is because it has a Star of David on top like this, and a star like this usually means that something is Jewish.

And this child is Christian, and he goes to church with his parents. He doesn't go to temple like the other boy. In church, this boy and his parents listen to the choir and sing special songs. They pray together and listen to the pastor read something from the Bible. The pastor explains what all the Biblical stories mean. This boy loves learning about people who lived long ago, especially Jesus and his loyal followers. Here is a picture of a church down here. One of the ways you can tell is because it has a cross on top like this, and a cross like this usually means that something is Christian.

This child is Jewish, and his favorite holiday is Lag Ba'Omer. Every year he gets to light big bonfires outside with his parents. He also loves playing with bows and arrows with his friends! Here is a picture of a Lag Ba'Omer bow down here.

And this child is Christian, and his favorite holiday is Easter. Every year he gets to paint pretty eggs with his mommy and daddy. He also loves looking for the candy the Easter bunny leaves him! Here is a picture of the Easter bunny down here.

This child is Jewish. Every morning, this boy says the Shaharit prayers when he wakes up. He thanks God for the new day. He says another prayer while he washes his hands. This boy reads his prayers from a siddur. Here is a picture of a siddur down here.

And this child is Christian. Every night, this boy says his prayers before he goes to bed. He thanks God for his friends and family, and he asks God to bless them. He also asks God to bless their church. This boy folds his hands like this when he prays.

Appendix G: Character Descriptions, Studies 4-5, Part II

Note: Boys heard the same story with male characters (and thus male nouns and pronouns). When definitions were required, the experimenter provided the following definitions: "A synagogue is a place where Jewish people go sometimes to worship God, and a rabbi is the person who leads the services in a synagogue. The rabbi might lead a prayer or teach people about God" and, "The Torah is something that Jewish people read sometimes. It tells them what God wants them to do, and it has stories about God." These definitions were provided even if children provided a definition of their own (e.g., the experimenter might say, "That's right, a synagogue is. . ." or, "Actually, a synagogue is. . .").

Look, this is the first person I'm going to tell you about. This girl is Jewish, and she celebrates Hanukkah by lighting candles in a menorah. Here is a picture of a menorah down here. Have you ever seen a menorah like this?

And here's another child. This girl is Christian, and she celebrates Easter by painting Easter eggs. Here is a picture of some Easter eggs down here.

This girl is Christian. She goes to church every Sunday and listens to her pastor. Here is a picture of a church down here. One of the ways that you can tell it's a church is because it has this cross on top, and a cross like this usually means that something is Christian.

And this girl is Jewish. She goes to synagogue every Friday and listens to her rabbi. Do you know what a synagogue and a rabbi are? Here is a picture of a synagogue down here. One of the ways that you can tell it's a synagogue is because it has this star on top, and a star like this usually means that something is Jewish.

This girl is Jewish. She eats challah every Friday night to celebrate Shabbat. Challah is a special kind of bread that some people eat to celebrate the Sabbath—here is a picture of it down here.

And this girl is Christian. She eats a wafer every Sunday in church. A wafer is a special kind of bread that some people eat to worship Jesus—here is a picture of some wafers down here.

This girl is Christian. She reads the Bible every week. Here is a picture of the Bible down here.

And this girl is Jewish. She reads the Torah every week. Here is a picture of the Torah. Do you know what the Torah is? Here's a picture of the Torah down here.

Appendix H: Experiment 1 Stimuli, Part III

Religious Items:

This child thinks that God knows all of our thoughts, and this child thinks that only we can know all of our thoughts.

This child thinks that after people die and are buried, all of them stay here in the ground, and this child thinks that after people die and are buried, some of them go to heaven.

This child thinks that when we pray out loud, God can hear us, and this child thinks that when we pray out loud, only other people can hear us.

This child thinks that no one can do miracles, and this child thinks that God can do miracles.

Opinion Items:

This child thinks that [participant's favorite dessert] is the tastiest dessert, and this child thinks that [different dessert] is the tastiest dessert.

This child thinks that [participant's favorite television character] is the best character on TV, and this child thinks that [different character] is the best character on TV.

This child thinks that [participant's favorite color] is the prettiest color, and this child think that [different color] is the prettiest color.

This child thinks that [participant's favorite game] is the most fun game to play, and this child thinks that [different game] is the most fun game to play.

Factual Items:

This child thinks that the Brachiosaurus was the biggest dinosaur, and this child thinks that the Ceratosaurus was the biggest dinosaur.

This child thinks that the Nile is the longest river in the world, and this child thinks that the Amazon is the longest river in the world.

This child thinks that McDonald's makes the most popular hamburger, and this child thinks that Burger King makes the most popular hamburger.

This child thinks that most people who have green eyes are girls, and this child thinks that most people who have green eyes are boys.

Appendix I: Experiment 2 Stimuli, Part III

Note: The items below are structured for participants who participants who responded affirmatively to all yes-or-no questions. Only the description of one character in each pair is provided; the second character was portrayed as the opposite of the first character (see first item for an example).

Religion Items:

This child reads holy books about God, but (s)he does not think that God knows all of our thoughts. This [other] child thinks that God knows all of our thoughts, but (s)he does not read holy books about God.

This child celebrates God with other people, but (s)he does not think that there is only one God.

This child thinks that God hears the songs that people sing to Him, but (s)he does not tell other people that there is only one God.

This child thinks that God wants to be celebrated by all people, but (s)he does not celebrate holidays in places where people go to pray.

Opinion Items:

This child thinks that [child's favorite TV character] is the best TV character, but (s)he does not read [child's favorite book] for fun. (Second character: This child reads [child's favorite book] for fun, but (s)he does not think that [child's favorite TV character] is the best TV character.)

This child eats [child's favorite fruit] for a snack, but (s)he does not think that [child's favorite song] is the best song.

This child thinks that [child's favorite color] is the prettiest color, but (s)he does not eat [child's favorite dessert] after dinner.

This child wears clothes that are [child's favorite color], but (s)he does not think that [child's favorite TV show] is the best TV show.

Cultural Norm Items:

This child goes to school in the fall, but (s)he does not think that eating dinner every evening is healthy.

This child thinks that it is important to get enough sleep, but (s)he does not close his/her eyes while sleeping.

This child thinks that sleeping on a pillow is comfortable, but (s)he does not give his/her friends gifts on their birthday.

This child puts his/her head on a pillow while sleeping, but (s)he does not think that brushing your teeth every day keeps them healthy.